Customer Understanding and the Lean Startup Approach in New Business Commercialization

Case Study of a De Alio Multinational Commercializing a New Product to an Unfamiliar Market

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Abstract

As the entry barriers to many industries are decreasing – mainly due to globalization, radical technological developments and overlapping industry boundaries – it is easier for new players to enter markets that they previously did not consider. Consequently, sustaining a competitive advantage has become increasingly more challenging in both low- and high technology industries. This has caused a significant impact on the international business environment where no organization is safe to operate as is without continuous development of their current as well as new businesses.

This study aims to provide organizations with a case example regarding the use of the lean startup approach in a new business commercialization initiative into an unfamiliar market by a de alio multinational. The main research question of this study is, "How to develop customer understanding during the commercialization process of a new offering to an unfamiliar market?" As the lean startup approach relies on experimentation and close collaboration with customers in order to develop a product or service, it was chosen as the main approach to be studied in order to develop this understanding. In addition, commercializing a new product to an unfamiliar market can be used as a probe for learning the market and therefore, this can be seen as a complementary method to be used with the lean startup approach in new business commercialization initiatives.

The literature review covers new business development with a focus on learning, followed by literature on customer and end user understanding, as well as the lean startup approach. This literature is used to create the theoretical framework to guide this research. The study is conducted using a qualitative research method utilizing data collected from 24 interviews. The interviewees consisted of various individuals within the case company, along with researchers, suppliers, startups, network founders, product and service providers, and professors.

The empirical findings emphasize the importance of accounting for the learning curve when entering a new and unfamiliar market, along with beginning to establish presence in the market early on. Furthermore, the findings suggest that as the customer or end user is the source that determines the true value of an offering, understanding the customer's business becomes crucial in new business commercialization initiatives, especially when these are targeted at unfamiliar markets. Lastly, commercializing a product using the lean startup approach enables an organization to both develop the offering itself, along with learning about the customer's and end user's needs, which in turn create understanding about the customer's overall business.

The case product team has been operating fairly well according to the 'best practices' of the lean startup approach, but several recommendations are made to the organization with regards to their commercialization process. These recommendations include: understanding the customer's business in depth, forming a clear value proposition, determining key purchase decision makers within customer companies, eliminating the issues that arise when using the product for the first time, attracting researchers that are in the early stages of their career, and starting to think about the product within the larger context of the organization's potential entrance into the life science industry.

Keywords Customer understanding, Lean startup, New business development, Unfamiliar market

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Tiivistelmä

Kiihtynyt globalisaatio, voimakkaasti nopeutunut teknologian kehittyminen sekä eri liiketoimintojen nivoutuminen lähemmäksi toisiaan ovat madaltaneet yritysten kynnystä siirtyä kokonaan uusille, entuudestaan tuntemattomille markkinoille. Kun uudet markkinat ovat saavutettavissa yhä useammalle yritykselle, kilpailuedun säilyttämisestä on tullut entistäkin vaikeampaa sekä korkean että matalan teknologian yrityksille. Tällä on merkittävä vaikutus kansainväliselle liiketoimintaympäristölle, jossa mikään yritys ei ole enää turvassa ilman nykyisten ja uusien liiketoimintojen aktiivista ja jatkuvaa kehittämistä.

Tämän tutkimuksen tarkoituksena on tuottaa yrityksille tietoa ja taitoa lean startup –menetelmän käytöstä uutta liiketoimintaa vieraalle markkinalle kaupallistettaessa. Tutkimuksessa selvitetään monikansallisen yrityksen case-tapauksen avulla, miten yritys voi sovittaa uuden tuotteensa vieraalle markkinalle ja kehittää asiakasymmärrystään. Tutkimuksen pääkysymys on: ”Kuinka kehittää asiakasymmärrystä uutta tuotetta vieraalle markkinalle kaupallistettaessa?” Lean startup –menetelmän käyttö asiakasymmärryksen lisäämisen välineenä valittiin tutkimuksen kohteeksi, koska kyseinen menetelmä perustuu asiakkaan tarpeiden mukaisen tuotteen tai palvelun kehittämiseen. Lean startup –menetelmässä systemaattinen testaaminen ja jatkuva asiakaspalautteen hyödyntäminen tukevat tehokkaasti asiakasymmärryksen saavuttamista. Uuden tuotteen kaupallistaminen vieraalle markkinalle toimii keinona saada konkreettista tietoa markkinan rakenteesta ja eri osapuolten toimintatavoista, mikä on hyvä lisä käytettäväksi yhdessä lean startup –menetelmän kanssa.

Kirjallisuuskatsauksessa tarkastellaan, kuinka oppimista voidaan hyödyntää uuden liiketoiminnan kehittämisessä. Lisäksi siinä käsitellään asiakasymmärryksen kehittämistä sekä lean startup –menetelmän periaatteita ja prosessia case-tapauksen kannalta. Valitulla kirjallisuudella on luotu se teoreettinen viitekehys, jonka avulla ohjataan tutkimusta. Tutkimus on toteutettu kvalitatiivisella menetelmällä, jossa on hyödynnetty 24 haastattelulla kerättyä tutkimusaineistoa. Haastateltavat edustavat niin case-yritystä kuin vieraalla markkinoilla jo toimivia yrityksiä sekä tutkijayhteisöä.

Empiiriset löydökset korostavat, että vieraalle markkinalle mentäessä on otettava huomioon oppimiskäyrä. Varhainen jalkautuminen markkinalle on myös tärkeää. Tulokset osoittavat lisäksi, että asiakas tai loppukäyttäjä määrää tuotteen oikean arvon. Täten asiakkaan liiketoiminnan ymmärtäminen muodostuu ratkaisevaksi uuden tuotteen onnistuneessa kaupallistamisessa vieraalle markkinalle. Lean startup –menetelmän hyödyntäminen uuden tuotteen kaupallistamisessa mahdollistaa tuotteen jatkuvan kehittämisen sekä asiakkaiden ja loppukäyttäjien tarpeiden ymmärtämisen. Näin kehitetään ymmärrystä asiakkaan liiketoiminnasta myös laajemmin.

Tarkasteltaessa case-tapauksen tiimin toimintaa, voidaan todeta, että tiimi on enimmäkseen noudattanut lean startup –menetelmän hyviä käytäntöjä. Kaupallistamisprosessin osalta yritykselle voidaan kuitenkin antaa seuraavia suosituksia. Asiakkaan liiketoiminnan syvempi ymmärtäminen, selkeän arvolupauksen muodostaminen sekä asiakasyritysten ostopäätöksiä tekevien henkilöiden tunnistaminen tukevat kaupallistamisen onnistumista. Lisäksi tätä auttavat ensikäyttäjien onnistuneen tuotekokemuksen varmistaminen sekä uransa alkuvaiheessa olevien tutkijoiden kiinnostuksen herättäminen. Tuotteen ymmärtäminen laajemmassa kontekstissa on tärkeää, mikäli yritys laajentaa yritystoimintaansa bioteknologiamarkkinalle.

Avainsanat Asiakasymmärrys, Lean startup, Uuden liiketoiminnan kehittäminen, Vieras markkina

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1.0 INTRODUCTION

As the entry barriers to many industries are decreasing – mainly due to globalization, radical technological developments and overlapping industry boundaries (Friedman, 2006; Berends et al., 2007) – it is easier for new players to enter markets that they previously did not consider. The recent economic crisis of 2008 has led to a startup boom, particularly in Europe where the startup scene has developed through events such as Slush, which has grown to an event with over 15,000 attendees in just a few years (Slush, 2015). According to the literature, sustaining a competitive advantage has become increasingly more challenging in both low- and high technology industries (Berends et al., 2007; Furr, Dyer and Christensen, 2014). This has caused a significant impact on the international business environment where no organization is safe to operate as is without continuous development of their current as well as new businesses.

Entrepreneurs from various fields are developing new products and services that are able to compete with the current offerings of the established companies. This is summarized well by Scott Cook, the founder and chairman of the executive committee of Intuit, "As a successful scaled company, you cannot run the ship the way you used to. You'll get run over by a swarm of start-ups" (Furr, Dyer and Christensen, 2014, p.1). This requires the traditional organizations to develop their products and services alongside these new entrants, as it is no longer enough that they focus on making their current operations and cost structures as efficient as possible (Blank, 2013; Berends et al., 2007). The increasing amount of trade agreements (WTO, 2016) along with the rapid technological developments have led to the 'flattening of the world' (Friedman, 2006), which makes expansion to new markets easier for companies and thus, there will always be another company that is able to manufacture a product or provide a service for a lower cost than you are (Blank, 2013).

Focusing merely on the efficiency of the current operations can be detrimental, if it is not combined with developing new businesses on the side (Berends et al., 2007). Consequently, continuously developing new sources of revenue is becoming essential, even for established companies, in order to keep up and survive with the rapidly changing and evermore competitive business environment (Owens, 2007; Cooper and Edgett, 2003; Gerwin and Ferris, 2004; Berends et al., 2007).

The old-fashion method to create new businesses within an organization has been to develop it – whether a product or a service – to its fullest potential with minimal testing, launching it to the market and hoping for the best (Blank, 2013). In the case of relative certainty, such an approach combined with traditional management practices may work well, but when attempting to enter unfamiliar markets where uncertainty prevails, focusing on the business model and careful strategic planning before experimentation is not sufficient (Chen, Damanpour and Reilly, 2010; Lynn, Skov and Abel, 1999; Furr, Dyer and Christensen, 2014; Berends et al., 2007). In addition, such an approach often forces a company to choose between multiple ventures it wants to pursue early on and provides the organization with very little certainty of the new business's success. Referring to Witell et al. (2011), the main issue here is that those working on the business are bound by certain borders, whether psychological or otherwise, which they are expected to adhere to. This can be detrimental in terms of the development of the business, as they are unable to 'think outside the box' so to say and see it from the perspective of the customer. However, there is a new method that these organizations are starting to use, which has been applied from the combination of agile startups and lean manufacturing, namely, the lean startup approach (Ries, 2011; Furr, Dyer and Christensen, 2014; Blank, 2013).

Lean startup is a process of experimenting a business in close collaboration with the customer, resulting in valuable feedback and learning, which in turn allows for necessary adjustments to the development of the business (Blank, 2013; Furr, Dyer and Christensen, 2014; Ries, 2011; Chen, Damanpour and Reilly, 2010). Furr, Dyer and Christensen (2014) state that the lean startup approach is relevant to solving any kind of complex issue, which therefore, makes it applicable to other areas as well, such as any aspects and functions related to the new business development process in general. By breaking this down, the lean part of this approach is taken from lean manufacturing, which refers to continuous removal of any parts or processes within a business that are not adding value and thus, allow for cost savings (Abdulmalek and Rajgopal, 2007; Dickson et al., 2009). Startup, on the other hand, refers to an early business venture that is evolving from the idea phase to the process of finding a feasible business model for a product or service, which is also sustainable in the long run (Blank, 2013).

The lean startup approach is more commonly used among startups, but it is starting to be accustomed among business developers in large established organizations as well (Furr, Dyer

and Christensen, 2014). Furthermore, it is expected that the large organizations are the true gainers from this approach in the long-run (Witell et al., 2011; Blank 2013), but this naturally requires the organizations to be able to implement such methods into their ongoing operations effectively.

As the lean startup approach or mentality within a large organization developing new businesses is a rather new concept, it has not been researched from an academic perspective to a great extent. One of the few books published on this specific topic is by Nathan Furr, Jeff Dyer and Clayton M. Christensen (2014) who analyze the process of how can innovation methods – whether called lean startup or design thinking – be adapted into organizations in their book *The Innovator's Method: Bringing the Lean Start-up Into Your Organization*.

Furr, Dyer and Christensen (2014) focus on the 'how' aspect of testing, validating and commercializing new businesses with the help of lean, design and agile processes. This Master's Thesis focuses more on the importance of customer and end user understanding along with the customer's business understanding, which goes deeper into the overall commercialization of the offering and the relevant processes involved. Furthermore, as this research is done as a case study with an actual multinational organization commercializing a new product to the life science industry – which is an unfamiliar market for the case company – it will provide academia with new perspectives regarding the use of the lean startup approach in the learning process of commercializing a new product to an unfamiliar market. Hoyer et al. (2010) also emphasize the lack of research with consumer co-creation and collaboration for experimentation purposes particularly in the commercialization and post launch phases, which can be thought of as the most critical stages when developing new products. Overall, literature on the topic of using the lean startup within organizations for new business development is lacking, which shows that this sector needs additional research.

1.1 Research objectives, questions and motivations

This study aims to provide multinational organizations with a case example regarding the use of the lean startup approach in a new business commercialization initiative into an unfamiliar market. As the lean startup approach relies on experimentation and close collaboration with customers in order to develop a product or service, understanding the role of the customer becomes essential when developing new businesses. Consequently, commercializing a new

product can be used as a probe for learning the unfamiliar market and more specifically, the customer's business. Since this Master's Thesis is conducted as a case study for a multinational organization, recommendations for this specific company and its new venture into the life science sector will be provided.

Taking into consideration the aforementioned matters, this Master's Thesis aims to provide an understanding on the following topic and answer the succeeding research questions:

> Customer understanding and the lean startup approach in new business commercialization – case study of a de alio multinational commercializing a new product to an unfamiliar market.

1. *How to develop customer understanding during the commercialization process of a new offering to an unfamiliar market?*
2. *How to experiment and learn efficiently from the customers?*

There are several academic and personal reasons for choosing the research topic in question. The academic reason is due to the fact that the lean startup approach has not been studied to great extent as a new business development mechanism within multinational organizations attempting to enter unfamiliar markets. As mentioned earlier the lean startup is a rather new concept, even though similar approaches have been used by entrepreneurs and organizations before, but combining it in the use of developing new businesses for unfamiliar markets where great uncertainty prevails still requires additional research. Because of the changes occurring in numerous industries and new players disrupting the game in many markets, established organizations need to be aware of this transforming environment in order to stay keep their business in operation. This brings me to my personal reasons for choosing this topic.

Multinational organizations have been able to enjoy a smooth ride in many industries for quite some time, but as the playing field for many of them is changing, new business development into unknown territories becomes increasingly important. I want to learn more about the requirements when dealing with such situations and hopefully develop a thorough understanding of what to consider when developing new businesses. Furthermore, I believe that the lean startup approach is a useful method for developing any business as it takes into

consideration the only stakeholder that truly matters – namely the customer. My aim is to work for a multinational organization or even a smaller international company that beholds innovation as one of their fundamental strategic objectives. Constantly developing new products and services on the side of their current operations should be at the core of every company in this rapidly changing business environment. This Master's Thesis is meant to provide me with an in-depth understanding of the use of the lean startup approach in new business development when attempting to enter markets with great uncertainty and thus, provide me with a strong knowledge base to build a career in the business development sector.

1.2 Brief description of the case

The case used in this Master's Thesis involves a de alio multinational organization developing a product for the life science industry, which is unfamiliar for them, as the organization has been operating in another field. The company has developed a product, which is new to them, but is not completely unique in the specific sector of the life science industry, as similar products already exist in the market. Consequently, the organization has developed a product, which can be seen as a line-extension within the target market, but new within the company itself. Therefore, it is essential for this de alio multinational to develop a knowledge based commercialization process to learn about their target market as quickly and efficiently as possible in order to reach the level of the competition, and pass them in the long run. Customer and end user understanding along with the lean startup approach are able to provide the case organization with the necessary support for this kind of learning.

1.3 Definitions of key concepts

Customer – Furr, Dyer and Christensen (2014) define a customer as "anyone with a problem or need, whether inside or outside the organization" (p.39). However, this definition considers customers to be people who have yet to pay for a product or service that is provided by a company and therefore, this could be more suitable to define a "potential customer". In addition, according to Simons (2010), company internal people should not be referred to as a "customer", as whatever the case, these people are never a company's primary target market and this can result in the organization losing focus of the actual strategy and main customer segment. The customer may change along the transformations that occur in the marketplace

and in the organization itself (Simons, 2010), but in essence a customer is a party that is currently using a service provided by a company or has purchased a product developed by a company.

De alio – York and Lenox (2014) state that de alio organizations can be understood as large organizations that are diversifying from their core business. York and Lenox (2014) emphasize that de alio organizations often possess immense resources along with complementary skills and functions, which can provide them with an initial competitive advantage over smaller companies when entering a new market.

End user – Piller and Walcher (2006) note that a user "is an actor who expects to profit from an innovation by consuming or using it" (p. 308). In more general terms, an end user is simply a party, often a person, that uses a product or service (Ko et al., 2011). Therefore, the end user does not have to be the customer. For example: with children's toys, a parent is the customer who pays for the toy, but the child plays with the toy and is therefore, the end user.

Lean – The term lean derives from the car manufacturer Toyota and the production systems they operate. The emphasis is on cost savings by cutting out any unnecessary processes or steps that are deemed as non-value adding activities, and adding others that provide value (Abdulmalek and Rajgopal, 2007; Dickson et al., 2009).

Minimum viable product (MVP) – Moogk (2012) states that a minimum viable product has been developed to a state where it is able to be tested and viewed by potential customers or users, in order to determine whether they see any value in it. An MVP should be completed with minimal financing and most of the emphasis should be put on experimenting with users, in order to pivot the product in the right direction (Moogk, 2012). An MVP is often used to create a proof of concept of a new offering, which validates the potential of the product.

Startup – Steve Blank (2013) defines a startup as "a temporary organization designed to search for a repeatable and scalable business model" (p. 67). A startup can be an organization that is operated by entrepreneurs, but it can also be an organization within a larger organization where employees or managers are involved in the creation of a new product or service.

Lean startup – As defined by Eric Ries (2011) the lean startup stands for "an organization designed to create products and services under conditions of extreme uncertainty" (p.34). The emphasis here is on dealing with extreme uncertainty, which is inevitable for organizations developing new businesses in order to enter unfamiliar markets. By combining the benefits from lean manufacturing where non-value adding activities are minimized or discarded completely, along with a temporary organization called a startup – the lean startup approach provides organizations with an innovative method by analyzing their new business ideas through quick experimentation and pivoting their original solution accordingly.

Value – As stated by Lepak et al. (2007) with reference to Bowmann and Ambrosini (2000), value can be divided into use value and exchange value. Use value can be understood as the perceived quality of a product by a user, which therefore make it subjective to each user's specific needs (Bowmann and Ambrosini, 2000). The exchange value, on the other hand, refers to the monetary amount paid by the user for the 'use value' of the product to the product provider (Bowmann and Ambrosini, 2000). Consequently, value of an offering in the end is determined by the customer or the end user.

Value chain – According to Porter (1985), a value chain can be understood as the interconnected tasks and processes within an organization, or those that begin from the raw material and move along to the final end user of a product. In the context of this research study, a value chain is considered as the interconnected tasks and processes that exist within an industry. To put this in perspective, an organization often needs to determine its location in the value chain along with its reach – the tasks and processes it wants to complete. These are often determined by where the organization is able to product the most value.

1.4 Overview of methodology

The study is conducted in qualitative form with a case study, as the aim is to address questions that evolve around "how" certain processes should be done within a multinational organization developing new businesses (Yin, 2009). New business development into unfamiliar markets is often a highly complex process and requires extensive analysis, which makes conducting a qualitative study the optimal choice (Eriksson and Kovalainen, 2008).

The empirical data was collected from interviews of which 24 have been conducted. The interviewees were both employees and managers within the multinational organization who have been involved in numerous new business development initiatives, and part of whom are currently on the team commercializing the new product into the life science industry. Various players – distributors, large and small organizations, researchers, scientists, etc. – from within the life science industry were also interviewed to further understand the operations within the market and how new entrants should proceed in order to succeed in the market. Lastly, these interviews naturally also addressed the use of the lean startup approach in new business development, be it within the life science industry or another, as it forms the basis for this study.

The interviews were sent to Tutkimustie Oy for transcription on an ongoing basis to help develop an initial idea about where the empirical data are headed. This also allowed for some modifications with regards to the questions for the upcoming interviews to make them more efficient with regards to this study. Once the majority of the interviews were completed, the transcriptions were read through and a coding system was applied accordingly. The coding system was taken from the results that emerged from the transcribed text, as in general it is more effective to let the results form the codes along with the categories. In addition, this reduced the possibility for the researcher's bias with regards to forming the codes beforehand.

Once the codes and categories for the interviews were formed, analysis on these was completed in order to be able to progress to the empirical findings. The validity and reliability of the conducted research were naturally considered along with any ethical concerns.

1.5 Structure of the thesis

The following chapter, number two of this Master's Thesis consists of the literature review relevant to the research question at hand. The chapter begins by introducing the literature on new business development with an emphasis put on aspects related to learning and knowledge management. The section also includes literature on developing an entrepreneurial mindset within an organization, along with considering for the time factor. This is followed by the importance of understanding the customer and the end user, along with customer co-creation literature, as this forms the basis for the lean startup approach. The lean startup approach and process will follow thereafter, along with its comparison to traditional new business

development methods. Lastly, the theoretical framework, which forms the boundaries for the study in question will be introduced.

The third chapter introduces the methodology in more detail, which begins by presenting the purpose of the study and the actual methods in which it will be conducted. The relevant case-study theory will be introduced thereafter. The data used for the study along with the validity and reliability of the overall research will be considered as well. Lastly, the ethical concerns that have to be taken into account throughout the research will be discussed.

The fourth chapter introduces the empirical findings of the research. The chapter begins by presenting the findings related to new business development within a de alio multinational with an emphasis on learning about a new market. This will then lead to the importance of customer understanding and the use of the lean startup approach in commercialization. These findings will mainly be presented in the light of the life science industry and the specific segment within that industry.

The fifth and final chapter begins by discussing the findings in comparison to the literature in order to see whether the research strengthens earlier studies. This will follow with an analysis of the case product team's progress in respect to the 'best practices' of the lean startup approach in new business commercialization. A number of areas for the case product team to consider next are discussed in the recommendations for the case organization section. Lastly, limitations of the study along with suggestions for further research will be presented.

2.0 LITERATURE REVIEW

This chapter introduces the relevant literature to the topic at hand, which has also been used to create the theoretical framework for this Master's Thesis. The chapter begins by introducing knowledge creation and management with regards to new business development within a multinational organization with a focus on learning. Literature on the importance of understanding the customer and end user is presented thereafter, as this forms the basis for the lean startup approach. This is then followed by the lean startup approach itself and its comparison to traditional new business development learning. A synthesis of the literature allows for the formation of the theoretical framework used for this study.

2.1 New business development

New business development in general covers a wide variety of areas and therefore, only the aspects that are directly relevant to customer understanding and the lean startup approach are presented here. Learning is an essential part when commercializing a new product and hence, this section begins by presenting literature on knowledge creation and management. As noted earlier, entrepreneurs are changing the game for established organizations through quick experimentation and pivoting to meet customer's needs. Therefore, developing an entrepreneurial mindset is discussed second. Lastly, as the life science industry is a very turbulent environment, the learning within the case product team needs to occur rather rapidly and therefore, the aspect of balancing between time and money concludes this section of new business development literature.

2.1.1 Knowledge creation and management

Berends et al. (2007) believe that relying too strongly on the current success of the established business operations of a company can be detrimental, as radical technological innovations can wipe the floor right underneath the organization. Therefore, it is critical that organizations develop new businesses where uncertainty prevails, alongside the current operations where knowledge already exists in order to be able to compete in the global business world (Berends et al., 2007).

Berends et al. (2007) and Lynn, Skov and Abel (1999) suggest that knowledge management can be considered a source of competitive advantage for many large organizations developing new businesses, as it is challenging for others to mimic due to its innate nature. When an organization is developing something new and attempting to commercialize the offering, an immense amount of learning happens within the team, which should not go unnoted. Learning teams or members within a team should be in place to collect and handle this knowledge in order to improve the overall development process of the offering and potential other ones that become relevant in the future (Chen, Damanpour and Reilly, 2010; Lynn, Skov and Abel, 1999).

Berends et al. (2007) believe that the traditional knowledge management methods – knowledge externalization, collection and distribution throughout the organization – often

used in new business development are not suitable for this purpose and can even harm the whole innovation process. By using explorative innovation strategies instead – such as experimenting, integrating and monitoring – organizations are more likely to succeed in radical new business development (Berends et al., 2007; Chen, Damanpour and Reilly, 2010; Lynn, Skov and Abel, 1999). Chen, Damanpour and Reilly (2010), Berends et al. (2007), Lynn, Skov and Abel (1999), Bonabeau et al. (2008), and Furr, Dyer and Christensen (2014) find that by going to market early an organization is able to determine the true value of their offering faster, which increases the speed of their whole commercialization process. Consequently, with such an approach new products are more likely to succeed (Chen, Damanpour and Reilly, 2010; Lynn, Skov and Abel, 1999). This in essence is what the lean startup approach is about, which drives for continuous testing and agile development of a new product or service. Such a method is extremely important in the case of radical innovations where an organization deals with great uncertainty. Figure 1 shows the various forms that innovation takes along with the type of technology involved in the different areas.

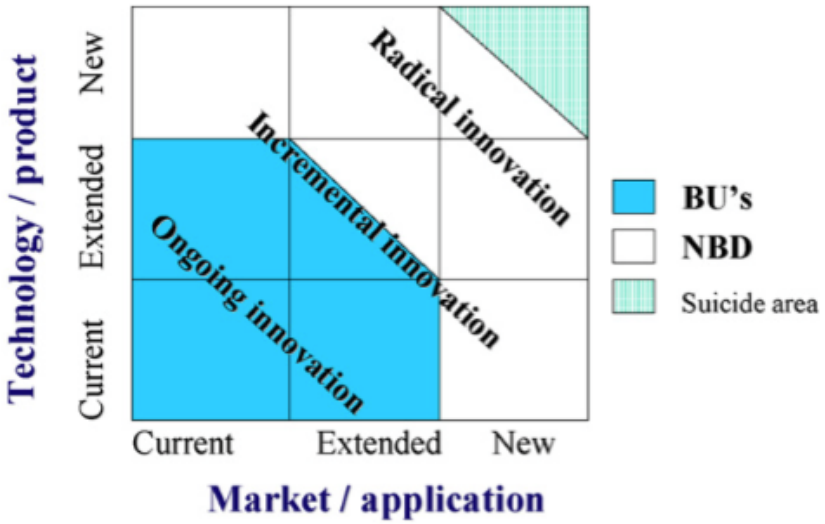

Figure 1: Forms of Innovation (Berends et al., 2007)

However, even though an explorative approach to new business development is essential at the early stages of an innovation, Berends et al. (2007) state that the traditional exploitative approach of knowledge sharing within the organization can and should be implemented as a supportive role in the innovation process. This should be applied together with a probe-and-learning approach as found by Chen, Damanpour and Reilly (2010). Overall, this combination allows for the questioning of the existing knowledge with the new emerging understanding and thus, develops the overall knowledge foundation within the organization (Berends et al.,

2007). Consequently, the organization is able to move from the radical innovation stage that entails great uncertainty to the incremental innovation stage where less uncertainty is present (Berends et al., 2007). The incremental innovation stage allows for organizations to work within certain boundaries, which makes their learning and development initiatives more concrete along with decreasing the amount of risk involved.

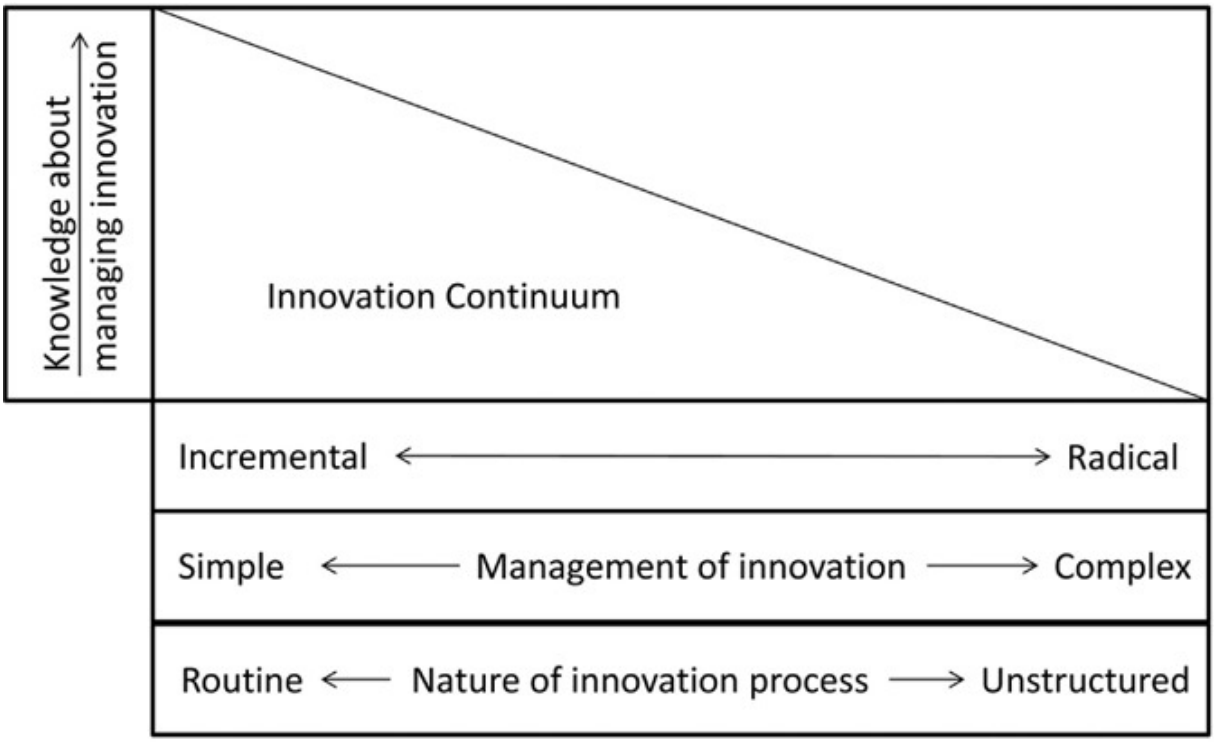

Figure 2: Innovation continuum (McIntosh and Taylor, 2013; originally from McLaughlin, Bessant and Smart, 2005)

As further emphasized in Figure 2, managing knowledge is more simple and routine-line when it is a case of incremental innovation, but with radical innovation, an organization can have immense challenges with the complexities involved (McIntosh and Taylor, 2013; McLaughlin, Bessant and Smart, 2005). Referring to the case at hand, the multinational organization is closer towards the radical side, as the product along with the target market are highly unfamiliar to them. One useful method that can be used to create such learning is applying entrepreneurial thinking in the new business development process.

2.1.2 Developing an entrepreneurial mindset

Startups are often thought of as agile organizations that are able to pivot their offering according to the needs of the market (Furr, Dyer and Christensen, 2014). Therefore,

entrepreneurial learning can and should be applied within the organizations developing new businesses. Baron (2006) suggests that it is important to understand how entrepreneurs create new business opportunities, as entrepreneurs have become to form a great part of the economic growth even in large economies.

Baron (2006) states that entrepreneurially minded people continuously participate in the search for new business opportunities, stay alert for opportunities when they arise, but also have experience and knowledge of a certain business, market or customer segment. This forms the foundation for entrepreneurs to scout out new business opportunities – in other words 'pattern recognition' – which are often at least partly within their knowledge area (Baron, 2006). However, it is also important to note that entrepreneurs are often more active in seeking for new opportunities, whereas managers naturally focus on their current operations and on its development (Baron, 2006). If entrepreneurs are so effective in searching out new business opportunities, why are large organizations not emphasizing such an ideation process within their employees and managers? Figure 3 provides Baron's (2006) overall framework of the entrepreneurial process of using pattern recognition to allow for the analysis of potential business opportunities.

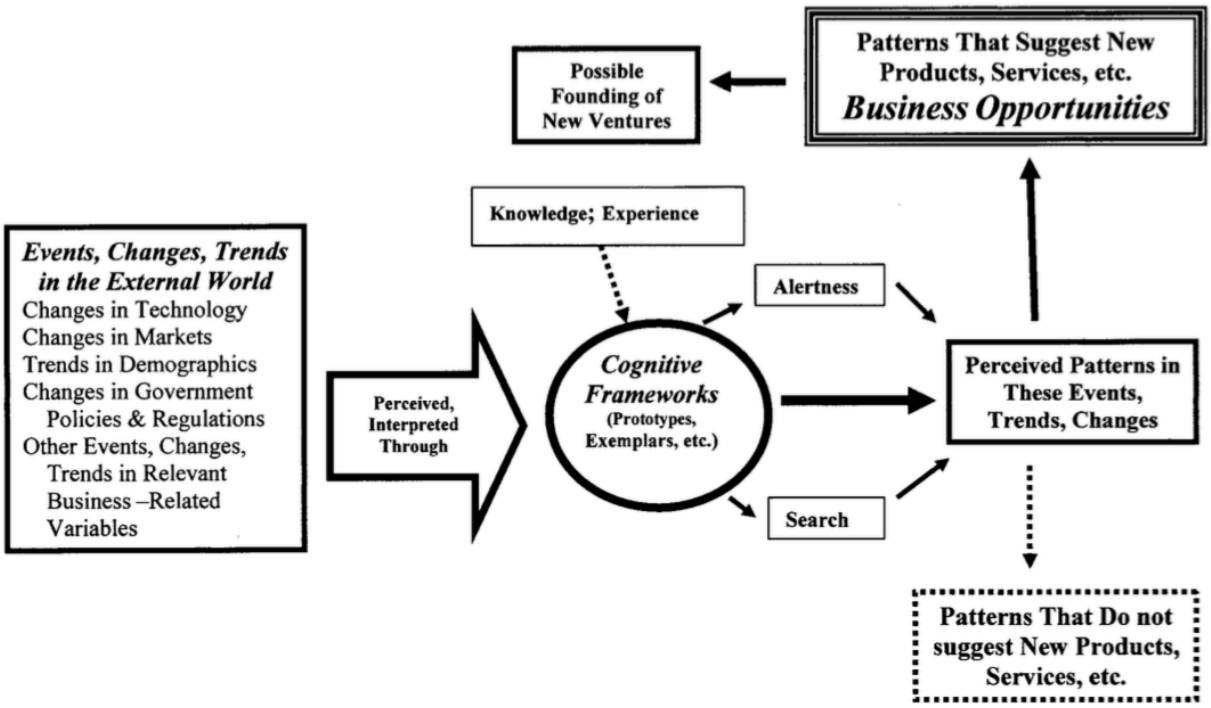

Figure 3: Opportunity recognition through pattern recognition (Baron, 2006)

When developing new products, Bonabeau et al., 2008 state that it is important to distinguish between the early and late stage development phases. As shown in Figure 4, the early stage new product development ought to function as an experiment where the focus is put on finding the truth and thus, reducing the amount of risk involved (Bonabeau et al., 2008). With regards to the case, this refers to determining whether the product functions according to the needs of the customers. As discovered by Chen, Damanpour and Reilly (2010) and Lynn, Skov and Abel (1999), such experimenting should be considered as a learning process. When entering a new and unfamiliar market, it is inevitable that a certain learning curve prevails. However, the earlier and faster the experimenting is done, the quicker the organization is able to reach the full commercialization stage (Chen, Damanpour and Reilly, 2010; Lynn, Skov and Abel, 1999).

When the amount of feedback from the customers has decreased to almost nothing, it can be determined that enough experimenting and testing has been done (Bonabeau et al., 2008). This allows the product to move to the late stage, or in other words the commercialization stage, where seeking success becomes the organization's goal and maximizing value through the commercialization process is emphasized (Bonabeau et al., 2008). When the product reaches the late stage, the main developments to the product should already have been done, which leaves incremental refinements to be completed by the product-based team (Bonabeau et al., 2008). The transformation from the early development stage to the late full commercialization stage does not necessarily have to be a 'jump', but can happen rather incrementally – meaning that the two stages can be functioning in parallel before emphasis is put on the commercialization. Even though this comparison and method refers to the pharmaceutical industry, it can be applied in other industries as well, especially when an organization is attempting to enter a market it has little knowledge of. Furthermore, this kind of experimentation is well in-line with the lean startup mentality where experimenting, customer co-creation and receiving customer feedback is emphasized.

Early	Late
Organizational Goal	
Seek truth	Seek success
Organizational Strength	
Establish novel products' promise or lack thereof	Take products to market
Organizational Approach	
Reduce risk	Maximize value
Maintain loyalty to the experiment	Maintain loyalty to the product
Focus on scientific method	Focus on commercialization
Operate with low fixed costs, low capital requirement	Operate with high fixed costs, high capital requirement
Work in small, experiment-based teams	Work in large, product-based teams
Emphasize testing	Emphasize refining

Figure 4: Comparison of early stage and late stage new product development in the pharmaceutical industry (Bonabeau et al., 2008)

Overall, it is essential to understand that an organization, whether large or small, should move through the early stage as quickly as possible, but without having a negative effect on the quality of the work. Consequently, balancing between time and money becomes extremely important in new business development initiatives, as these two 'resources' are usually limited.

2.1.3 Balancing between time and money

As the amount of financial and human capital involved in the early stage as well as the late stage product development is often limited, along with the time constraints, it is essential to determine the balance between these two factors (Owens, 2007; Hutlink et al., 2000; Cooper et al., 2004). Owens (2007) analyzes the issues involved in the implementation of a new product development process, along with the commercialization, and finds that there are numerous factors that need to be considered in order to develop this process. The study finds

that the four main areas that play a critical role in the new business development process are: support from senior management, integration of functional capabilities early on, availability of necessary resources along with their respective managers, and an environment supportive for teamwork (Owens, 2007). By providing these to the new business development unit, an organization can reduce the risks involved and increase its probability of getting the product or service to market on time and on budget.

Now, what should the organizations focus on when commercializing a new product or service? Even though it is widely known, first-movers can have their advantages, but also their risks, as shown in several cases where the followers profited more from a similar innovation as the one who entered or even created the market (Owens, 2007). Consequently, organizations need to balance between time and money. Hutlink et al. (2000) find that organizations that focus on the budget aspect, but commercialize their products six months too late damage their potential profit over a five-year period by one third. This emphasizes the importance of rapid experimentation for fast learning. On the other hand, organizations that focus on the time constraint, but go over their budget by 50% only make a dent of five percent on their profit during the same period (Cooper et al., 2004). Therefore, organizations should focus more on keeping within the time frame of the commercialization and not be as concerned with the budget. If more capital – whether financial, human or other resources – is needed, this should not be considered an obstacle, as according to the literature, the profits will not suffer as much as with not staying within pre-determined market deadlines.

In new business development, it is essential to keep an open mind with any inventions and their respective initial application areas. In the study conducted by O'Connor and Rice (2013), two of the companies that kept their breakthrough innovation within the boundaries of their current product lines and business models were unsuccessful in reaching the full potential of the innovation. Even though creating a new market infrastructure within an organization requires additional investments, without taking such actions, the product is less likely to have the hoped for impact on the market. In addition, it is essential that knowledge management is done throughout the learning process of the new business development and commercialization phases (Berends et al., 2007; Chen, Damanpour and Reilly, 2010; Lynn, Skov and Abel, 1999), as it enables an organization to develop the areas, which may otherwise hinder the overall commercialization process.

Learning, knowledge management, creating an entrepreneurial mindset, along with balancing between time and money are essential aspects in the new business development process. However, in order for the case product team to create the correct kind of learning, they need to understand the customer's business along with the needs of the end users.

2.2 Customer and end user understanding

Before analyzing the current literature on the lean startup approach, it is important to understand the importance of customers and end users, along with what the case product team can learn from them, as this forms the basis to the lean startup commercialization process. First of all, as the case product team along with the case organization are unfamiliar with the life science industry, they need formulate an understanding of the customers and end users, as this can improve their ability to formulate a value proposition that addresses the needs of the customer. By developing a deeper understanding of the customer's business enables the case product team to learn about the various aspects that need to be considered in this unfamiliar market. Including the customer in the overall product and commercialization development process can enable this learning.

2.2.1 Identifying and creating customers

A customer is a party that consumes or uses the products or services provided by a business for their own use or for that of their business (Simons, 2010; Business Dictionary, 2016). As in some cases the customer may not be the end user of the product or service, it is important to establish the meaning of the end user as well – a party that uses an end product or service (Ko et al., 2011; Business Dictionary, 2016). Whether organizations are developing products or services that they offer directly to the end user or not, it is essential that they understand the needs of this party, as they will determine the true value of the offering.

As stated by Furr, Dyer and Christensen (2014), companies often begin developing a solution before fully comprehending the problem they are attempting to solve. Therefore, it is essential to understand the issue at hand from the customer's perspective. Intuit's CEO Brad Smith puts it this way, "To walk a mile in your customer's shoes, you have to take your own shoes off first" (Furr, Dyer and Christensen, 2014, p.33). In other words, you have to pretend to be the customer.

Hoyer et al. (2010) state that due to the Internet and other technological developments, consumers and businesses have access to information that allows them to compare the offerings of the products and services that they consider acquiring. They find that this has resulted in consumer 'empowerment' and hence, has increased the consumers' willingness to be involved in the value creation process (Hoyer et al., 2010). However, it can still be challenging to find those customers that are intrigued about being a part of the development process (Hoyer et al., 2010). According to Ulaga and Chacour (2001), how to deliver increasing value to customers has become one of the main concerns of many organizations.

Enkel, Perez-Freije and Gassmann (2005) focus on customer identification in new product experimentation. They find that identifying the correct customers with the relevant technological knowledge – if the new product is technical – is essential, but if these customers are not given the opportunity to share their knowledge throughout the experimentation process, it negates the whole purpose of the experiment. Therefore, careful consideration should be given for the method used in the experimentation, along with ensuring freedom for the customers apply their knowledge and analyze the offering accordingly (Enkel, Perez-Freije and Gassmann, 2005). This in turn should then be applied to the learning process within the organization.

An issue that often arises is that organizations fail to create customers, as they are focusing on capturing the value from the customers (Furr, Dyer and Christensen, 2014). If the company is unable to attract the customers in the first place, there is no value to be captured. According to Furr, Dyer and Christensen (2014) there are two types of uncertainty that have an impact on an organization's ability to create customers: demand uncertainty and technological uncertainty. Demand uncertainty increases with the amount of unknowns involved in customer preferences and behavior. However, this can be controlled to a certain extent by including the customer early on in the development process (Enkel, Perez-Freije and Gassmann, 2005). Technological uncertainty, on the other hand, increases together with the total rate of technological invention in any specified industry. Technological development enables some companies to develop faster and others to fall faster, which in turn has an effect on the customer preferences. Customers are demanding new products and services at a faster pace than ever before (Furr, Dyer and Christensen, 2014). By having a close collaboration

relationship with customers, an organization is able to develop this understanding earlier, which allows for necessary changes to be made to the offering.

2.2.2 Understanding the customer's business through co-creation

Alam and Perry (2002) emphasize the importance of customer involvement in service development, as the service provider is in direct or indirect contact with the customer throughout the delivery of the offering. However, even though the importance of customer involvement in service-related businesses should be rather obvious, Callahan and Lasry (2004) find that customer input becomes increasingly vital in new product development as well. According to their study, the importance of customer involvement increases with the level of market and technological 'newness' involved (Callahan and Lasry, 2004). In other words, the newer the market or the technology used in the product, the more essential it becomes to include the customer in product development. However, for completely new products, Callahan and Lasry (2004) and Gustafsson et al. (2012) state that the importance of customer involvement only goes to a certain point, as the customers themselves may not be fully aware of what they want from the completely new product. However, the customer and user should still be included in the overall experimentation and development process in order to receive feedback for the offering from a user's or customer's perspective, as in the end, they are the ones that determine the true value of a new offering (Furr, Dyer and Christensen, 2014; Blank, 2013; Witell et al., 2011; Piller and Walcher, 2006).

Gustafsson et al. (2012) state that the extent and quality of communication and interaction in customer co-creation are essential for new product developments and their success. Gustafsson et al. (2012) and Witell et al. (2011) both find that when new business development is done through customer co-creation, the results are more profitable than when applying traditional market research methods. This requires for organizations to adopt a more open innovation model where the customer is given early access to the innovations (Piller et al., 2010, Gustafsson et al., 2012). Gustafsson et al. (2012) emphasize the importance of understanding how the customer develops its own value through the offering, as this can enable an organization to improve the product or service. However, here it is important to distinguish between incremental and radical new business development.

In the case of incremental innovation, the frequency, direction and content of the communication show the most significant contribution (Gustafsson et al., 2012). In other words, constant communication in a democratic manner that focuses on certain content area should be done when co-creating with customers (Gustafsson et al., 2012). With radical innovation, the frequency of customer contact is also found to be important, but the direction – whether mutual or one-sided – of the communication is not deemed to have significant effect on the new business's success.

The content, however, has a negative effect according to Gustafsson et al. (2012), meaning that when developing an offering that is outside of the current customer understanding, customers are often not aware themselves whether they will like it before actually having used it. Therefore, in the case of radical innovations it becomes even more critical to allow for customers to test the offering, in order to understand its viability. However, as the customers may not know what they actually want from a completely new product or service, it may be difficult to receive new ideas regarding the product, which makes the whole approach more of a trial-and-error kind – creating something and giving it to customers for validation. As stated by an Apple designer, "At Apple we don't waste our time asking users, we build our brand through creating great products we believe people will love" (Gustafsson et al., 2012, p. 326). Even though this Apple designer states that asking users is a waste of time, the true value of the product or service can only be determined by the customer or end user and therefore, they should be used for validation (Witell et al., 2011). Regardless of whether customers should be asked about an offering early on, it is inevitable that they will determine the value of a product when it is launched to the market. Consequently, why not get their opinion before it is too late?

Hoyer et al. (2010) state that if the customer co-creation process is implemented and managed correctly by an organization, significant benefits on firm performance can arise. The productivity becomes more efficient through cost-minimization, as the input and ideas generally delivered by employees can be transferred to the customers in the development phase (Hoyer et al., 2010; Bowers et al., 1990; Lovelock and Young, 1979). Possibility for product failure decreases, as the experimentation and testing validates the offering before full commercialization (Hoyer et al., 2010; Cook, 2008; Ogawa and Piller, 2006). This in turn allows for lower inventory holding costs, since if the product were not to gain traction in the

market, inventory would sit in warehouses (Hoyer et al., 2010; Cook, 2008; Ogawa and Piller, 2006).

Even though it is important to commercialize the right kind of a product or service along with a functional business model, customer co-creation allows for a company to enter a new market more rapidly (Hoyer et al., 2010; Fang, 2008; Joshi and Sharma, 2004; Sawhney et al., 2005). The customer co-creation process can also enable an organization to develop and explore further applications in other areas for their product or service (Hoyer et al., 2010; Grewal et al., 2006; Muniz and Schau, 2005; Xie et al., 2008). Organizational efficiency is one area where benefits are seen, but the overall effectiveness of a company is also deemed to have its gains.

When an offering is co-developed with customers, it naturally provides a 'closer fit' to the needs of the customer and thus, provide the organization with greater potential for successful commercialization of their new product or service (Hoyer et al., 2010; Fang, 2008; Palmatier and Evans, 2008; Lilien et al. 2002). Such offerings can also have a higher commercial attractiveness compared to other products when consumers hear about it having been developed together with the users (Hoyer et al., 2010; Franke et al., 2006; Magnusson et al., 2003). Furthermore, the co-creation process can result in a generally more positive connotation to the offering and after customers try it, the likelihood of referring it to others increases (Hoyer et al., 2010; Franke, 2006; Keinz and Steger 2009; Mathwick, Wiertz, and DeRuyter 2007).

Even though the co-creation is proven to have great benefits to both the organization and the customer, challenges are naturally involved as well. Hoyer et al. (2010) state that when customers are involved in the development process of a new offering, the organization loses some of its control on strategic management and planning. If the company were to initially be focusing on radical innovation, when the customer is involved, the transition may be too great for them and thus, they may attempt to bring it towards a more incremental form (Hoyer et al., 2010). Another issue is the effect on the brand of the company, as it is now co-managed in part with the customer, which creates uncertainty for the firm (Hoyer et al., 2010; Pitt et al., 2006). The customer co-development also has an impact on the coordination requirements of managing the interests of the various stakeholders involved, which increases the overall operational complexity (Hoyer et al., 2010). Lastly, the consumers may attempt to develop a

competing offering, if they feel that they have not received a reward worthy of their time and effort (Hoyer et al., 2010). This, however, requires the consumer to be extremely careful with any legal documents they may infringe upon.

As seen in the literature on customer and end user understanding, when an organization considers the customer in their new business develop initiative, they are able to direct an offering to better meet their needs and thus, create more value. A customer or end user truly is the only source for determining the true value behind an offering and therefore, they should be kept close by throughout the development and commercialization process. By applying such a method of acquiring constant feedback from the customer or end user, an organization can mitigate most of the risk involved in the new business development process. Such an approach is known as the lean startup.

2.3 Lean startup

The lean startup can be considered as an experimentation method to develop a proof of concept – whether for a prototype or just an idea. Some consider it to be an approach that can be used for any kind of a problem (Furr, Dyer and Christensen, 2014). This section begins by presenting the lean startup approach in more detail, which is followed by the lean startup process. A comparison to traditional new business development methods is provided thereafter. These subsections are discussed in the light of the case.

2.3.1 The lean startup approach

The lean startup focuses on experimentation with customers in order to create a viability check with regards to the core business assumptions that an organization believes to have (Müller and Thoring, 2012). Such experimentation should be done as early as possible, even at the idea stage before a prototype is developed (Müller and Thoring, 2012; Blank, 2013; Furr, Dyer and Christensen, 2014; Witell et al., 2011). By demonstrating a new offering to a potential customer, the developer – whether an organization or a startup – is able to receive immensely valuable feedback on the product or service, and whether there even is a demand for it (Müller and Thoring, 2012; Blank, 2013; Furr, Dyer and Christensen, 2014; Witell et al., 2011). Why develop something that nobody needs or values?

According to Furr, Dyer and Christensen (2014), the lean startup mentality has been available in parts in various disciplines – design-thinking in engineering, agile software in computer science, lean startup in entrepreneurship etc. – but their combined use in an organizational setting has not been studied. Consequently, Furr, Dyer and Christensen (2014) have combined the philosophies from these disciplines in order to provide a holistic view of the methods, and when and where they should be applied in the new business development process. Figure 5 demonstrates the innovator's method along with the applied philosophies from different disciplines at each stage. The innovator's method will be explained in more detail in section 2.3.3.

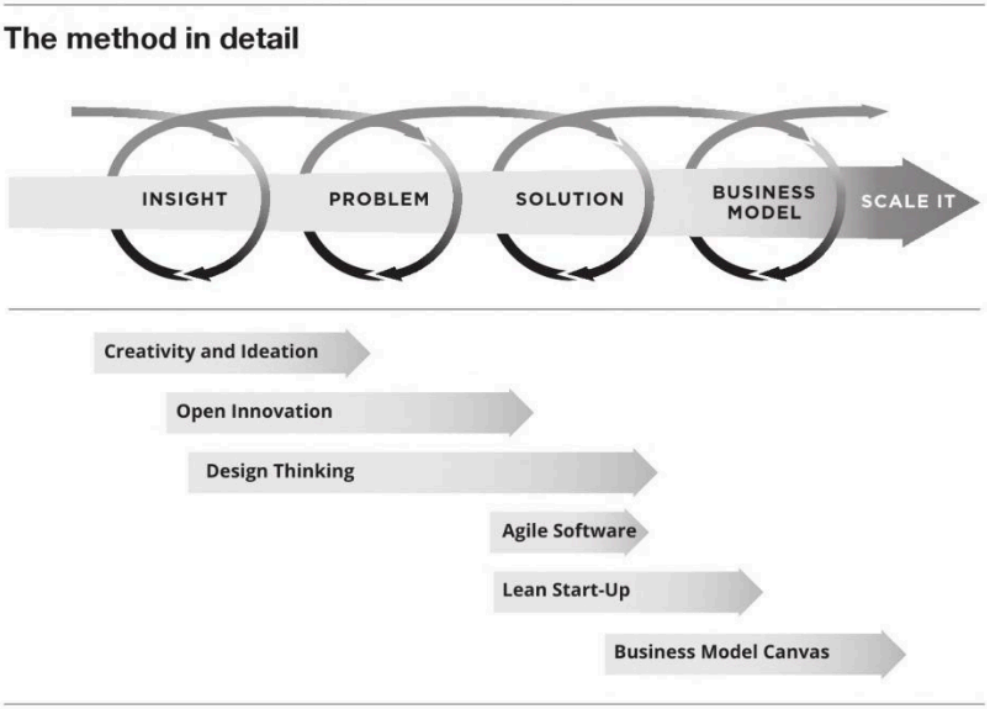

Figure 5: The innovator's method applied with disciplinary methods (Furr, Dyer and Christensen, 2014)

According to Blank (2013), the key difference between established companies and startups is that, whilst the former implement business models, the latter tries to find one. This is an essential aspect to note in this research study, as the case involves a de alio multinational that is established in another industry compared to the one they are developing the new product for. According to Witell et al. (2011), the customer is the only one that is able to determine the true value of a business. When a customer tries a product or service for the first time, they see it from a distinct perspective as compared to the actual developers of the business, which is not limited to any boundaries that would restrict their analysis of the business (Witell et al.,

2011). Consequently, the customers can provide organizations with extremely valuable information with regards to the current functionality and attributes of the product or service.

It is essential for organizations to understand that even though they are the providers of an offering, they are not the consumers, which can make it difficult for them to understand the true nature of the product or service. Customers, on the other hand, can be particularly demanding with regards to what they purchase and thus, evaluate it with a critical eye, which can be key to developing the value proposition. Therefore, as found by Chen, Damanpour and Reilly (2010), Witell et al. (2011) and Piller and Walcher (2006), new business development teams should be externally integrated with customers. This is essentially what the lean startup approach enables. When a de alio multinational begins to develop a product for an unfamiliar market, customer and user contact should be taken early on to determine the viability of their potential offering.

2.3.2 The lean startup process

Figure 6 demonstrates the idea behind the lean startup process as adapted from Ries (2011). As shown in the figure, ideas should be created into a viable product or service, which is then tested with customers to receive feedback. However, as stated by Müller and Thoring (2012), even an idea of a new offering can be demonstrated to potential customers in order to see their reaction and receive their input on the product. This information is evaluated in order to determine what areas of the offering require changes or developments. The necessary changes are made to the offering – also known as pivoting – and the same process is done once again (Ries, 2011; Blank, 2013; Müller and Thoring, 2012). This should be implemented for as long as the customer – and thus the market – are satisfied with the features of the product or service (Ries, 2011).

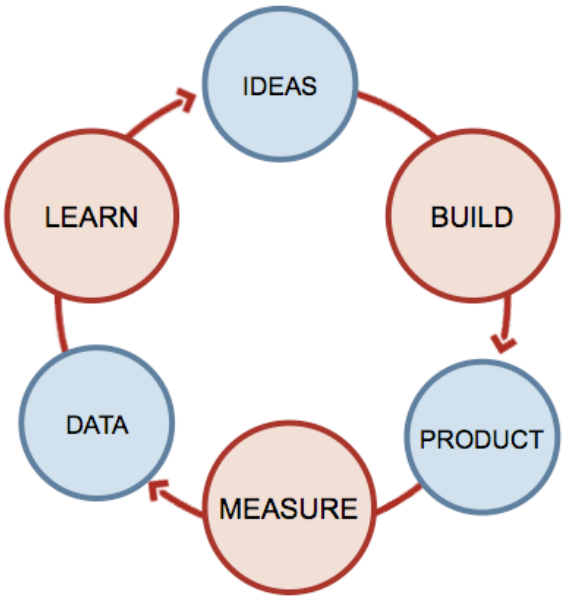

Figure 6: The feedback loop (Ries, 2011)

However, even when a product is deemed to be ready, customer needs and demands will change, which makes even product development a continuous process (Müller and Thoring, 2012). The total time used to go through the feedback loop should be minimized, as this allows for agile development of the offering (Ries, 2011). This makes the whole new business development process more incremental, which in turn makes it more efficient and thus, less costly. This should also be noted by the case organization, especially since they have little in-depth knowledge of the life science industry. Consequently, continuous involvement and experimentation with the customers is needed to be able to pivot accordingly to the needs of the customer and the market.

Piller and Walcher (2006) emphasize the importance of including customers or users in the new product development process, as in many cases it has been the users that have come up with an innovative idea. They believe that Internet-based toolkits for idea competitions – to which they refer to as TIC's – provide organizations with a clever new method to integrate users into the development process (Piller and Walcher, 2006). TIC's enable organizations to receive ideas from users, which are then evaluated and the best ones are provided with a reward (Piller and Walcher, 2006). This provides an incentive for the users to submit new ideas and according to the study, organizations are receiving innovative ideas, which may have otherwise not been developed (Piller and Walcher, 2006). A similar method could be

applied by the case organization, where researchers are asked to improve the overall research process in which the case product is used.

How product experimentation and validation affects the overall learning process within an organization needs to be considered, as stated by Berends et al. (2007), Chen, Damanpour and Reilly, (2010) and Lynn, Skov and Abel (1999). Khanna et al. (2015) study the impact of failure on organizational learning and R&D performance, and find that small failures have a positive effect on the quality of the R&D output, but a negative effect on R&D quantity. When considering the case organization and their new product into the life science industry, the quality of the product far exceeds the importance of the quantity, especially when biology is involved – if the product does not function properly with regards to the biological requirements, the product will not gain traction in the market.

Even though experiments can be of any kind and include various stakeholders, Khanna et al. (2015) emphasize their use, as it allows an organization to find the right modifications to whatever they are testing. This is especially important when the experimentation includes actual customers in new markets, as the level of uncertainty is high. In addition, the more experiments a company does, the more failures will occur, but in turn, these will increase the probability of finding the successful product commercialization model (Khanna et al., 2015). With regards to the case organization, the applications where the product is used are rather complex, which often requires fine-tuning of the product to enable its use in these specific applications used by the customer.

O'Connor and Rice (2013) suggest that when a market already exists to a certain extent, taking a multiple exploratory approach to customer understanding before committing to a certain area is recommended. These can be thought of as the various applications within the specific sector of the life science industry. This enables a company to get an initial idea on multiple market opportunities for the potential of its product, and how the product may be applied accordingly within each market. An organization may find surprising applications for the initial idea by experimenting with customers in various sectors. Constantly searching and modifying business models is also important, especially when entering unfamiliar and new markets (O'Connor and Rice, 2013). Developing a great new offering is only the beginning, as it still requires a functional business model around it. Therefore, by applying the lean startup approach in the business model part of the case product's commercialization process

as well, allows for continuous development to find the right form that pleases the customers and thus, creates the most value for them and for the organization.

2.3.3 Comparison to traditional new business development methods

According to Berends et al. (2007) and Furr, Dyer and Christensen (2014), when uncertainty is involved in the development of new businesses, the traditional management practices are no longer the most sufficient method. Careful planning and strategizing in such situations is often time-consuming and takes up an immense amount of resources (Furr, Dyer and Christensen, 2014). In the end, these are still often not able to provide an organization with accurate information regarding their offering. Figure 7 provides a ranking of various industries based on the level on uncertainty involved.

Industries ranked by level of uncertainty

	Measures of uncertainty		
Industry	R&D % of sales	Revenue volatility	Firm turnover*
1. Medical equipment	8.2%	90.7%	13.1%
2. Computers	5.8%	98.8%	12.0%
3. Computer software	9.8%	69.9%	14.4%
4. Pharmaceutical products	17.4%	63.3%	12.7%
5. Measuring & control equipment	9.3%	97.0%	8.8%
6. Machinery	3.2%	100.5%	9.3%
7. Agriculture	10.8%	123.3%	4.9%
8. Electronic equipment	5.2%	61.5%	10.5%
9. Chemicals	3.0%	71.2%	9.2%
10. Electrical equipment	9.8%	35.0%	9.2%
24. Business services	3.2%	46.2%	6.5%
40. Business supplies	1.4%	34.8%	5.0%
41. Shipping containers	0.5%	65.1%	4.9%
42. Real estate	1.3%	57.6%	3.0%
43. Beer & liquor	2.3%	12.8%	3.7%
44. Personal services	0.3%	59.7%	4.4%
45. Tobacco products	1.0%	20.3%	5.2%
46. Insurance	2.2%	30.4%	0.9%
47. Wholesale	0.1%	14.1%	6.3%
48. Utilities	0.2%	45.6%	0.2%
49. Precious metals	0.1%	40.7%	1.5%

*Percentage of (entrance + exits) / total firms in the industry per year

Figure 7: Industries ranked by level of uncertainty involved (Furr, Dyer and Christensen, 2014)

When high uncertainty is involved – as in the case of the medical equipment, computer and pharmaceutical industries for example – managers and leaders should not be the main decision makers. Instead, they should facilitate hypothesis and experiments together with their team and analyze the data accordingly, which will then make the decision for them (Furr, Dyer and Christensen, 2014). Furr, Dyer and Christensen (2014) suggest using an approach that they call the innovator's method (Figure 8), which is closely based off of the lean startup mentality – experimentation and agile development – as it enables an organization to understand and solve the numerous uncertainties around their new business. Each one of the stages involves a 'hypothesis, test and learn' loop (Furr, Dyer and Christensen, 2014), which is similar to that suggested by Ries (2011).

The lean startup method begins by focusing on generating an insight or an idea, as this will then lead to identifying the problem at hand for which a solution is needed. Including a customer should already be considered at this stage in the process. A minimum viable product should be created with minimal resources in order to experiment its functionality with the customers (Berends et al., 2007; Chen, Damanpour and Reilly, 2010; Lynn, Skov and Abel, 1999; Furr, Dyer and Christensen, 2014; Bonabeau et al., 2008; Ries, 211). Once enough pivoting and development to the offering has been done, it can be launched for commercialization together with an initial business model. As the business model is likely not the most favorable one right at the beginning, various models should be tested in order to find the best one (Furr, Dyer and Christensen, 2014; Müller and Thoring, 2012; Blank, 2013; Bonabeau et al., 2008). With regards to the case product team, the customers should be asked for their opinion regarding the business model in order to provide a solution that best meets their needs, but also allows for the company to make a profit.

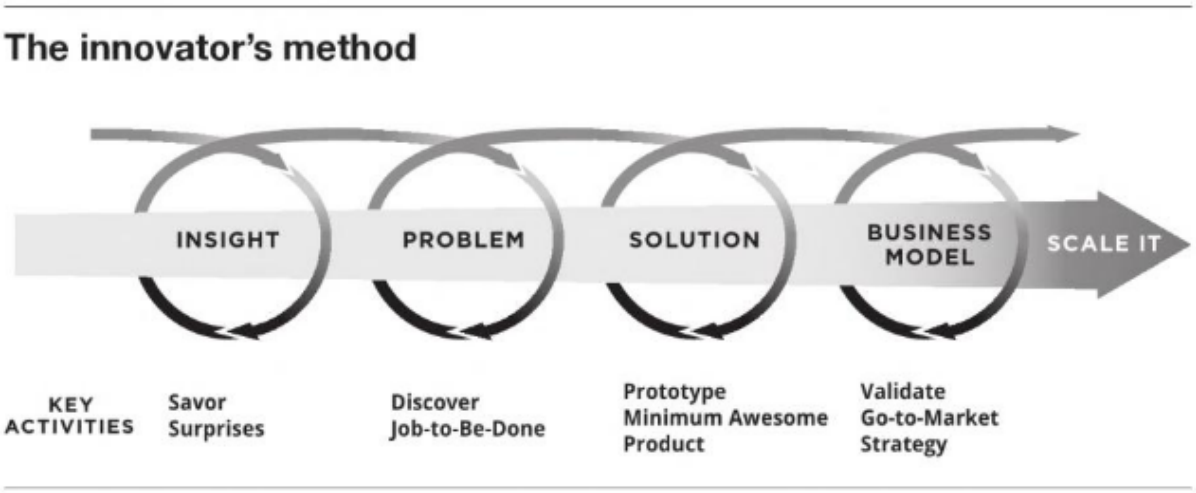

Figure 8: The innovator's method (Furr, Dyer and Christensen, 2014)

According to Blank (2013), the lean startup approach differs to the traditional in-house development of products particularly in three ways: experimentation instead of elaborate planning, customer feedback instead of intuition, and iterative design instead of big design up front. A company with a lean mindset in general differs greatly from a company with a traditional one. The business plan in a traditional company is often implementation-driven, whereas with the lean approach, it is hypothesis-driven (Müller and Thoring, 2012; Baron, 2006; Blank, 2013), meaning that one or multiple versions are tested to determine whether the hypothesis was right or wrong. Consequently, the lean startup focuses on constant experimenting and understanding what features an offering should have in order to best serve the customers and provide the company with the greatest value (Müller and Thoring, 2012; Blank, 2013; Furr, Dyer and Christensen, 2014; Chen, Damanpour and Reilly, 2010). With regards to the case product team, by constant experimentation with the customer, the team is able to better understand the customer requirements, which enables the formulation of a clearer value proposition.

As mentioned earlier, when developing new products, a traditional company tends to focus on preparing the offering in secret, with everything being fully specified and planned for before launching it to the market (Blank, 2013). With a lean company, the emphasis is on presenting an offering directly to potential customers as soon as a presentable prototype is ready, and developing it iteratively and incrementally according to the feedback (Müller and Thoring, 2012; Blank, 2013; Furr, Dyer and Christensen, 2014; Chen, Damanpour and Reilly, 2010). This enables for quick feedback and development of the offering together with the customers (Müller and Thoring, 2012; Blank, 2013; Furr, Dyer and Christensen, 2014; Chen,

Damanpour and Reilly, 2010). Witell et al. (2011) refer to a similar aspect by emphasizing the importance of taking a proactive approach instead of a reactive approach, which enables an organization to understand both the explicit – clearly expressed – and implicit – hidden or implied – requirements of an offering. Consequently, it is not enough for the case product team to merely communicate with the customers, but instead, get to know the actual processes that are involved in the customers' operations. This allows for a better understanding of the overall process to which a product can be modified accordingly to provide more value.

The lean approach enables the development of the product or service with multiple small steps, either backwards or forwards, whereas the traditional approach takes big steps in either direction, which often makes the development of the final offering slower and more expensive. Traditional organizations tend to hire people based on their prior experience and capability to execute tasks (Blank, 2013; Müller and Thoring, 2012), in other words, to get things done. This is not the case in organizations that value the lean startup mentality. Ability to learn, being agile and quick are aspects that are emphasized when hiring in an organization that thrives to develop new businesses (Blank, 2013; Müller and Thoring, 2012). As the playing field is rapidly changing in numerous industries, organizations need people who are able to learn and adapt accordingly. Therefore, the case organization should focus on people, or even partners, that are aware of the volatile life science market, where learning is considered an essential part of the overall commercialization process.

The financial reporting in a traditional company focuses on income statements, balance sheet and cash flow statements, whereas in the lean startup approach, even though these same metrics matter, other metrics that are more closely related to the actual offering are deemed as more valuable (O'Connor and Rice, 2013; Müller and Thoring, 2012; Blank, 2013). These include factors such as customer acquisition cost, customer lifetime value, churn rate – the turnover rate of employees or customers, viralness – how quickly the awareness of an offering is being circulated on the Internet, and others (Blank, 2013). Setting unrealistic expectations and merely focusing on the revenues and profits during the early phases of a product or invention launch can be detrimental when it comes to the long-term success of the product (O'Connor and Rice, 2013). Consequently, the case product team should focus on other aspects, such as whether the customers are giving any value to the offering. In addition, lean companies operate and make decisions based on good enough data, and failure is not frowned upon. This means that the case product team is forced to take chances, especially in such a

turbulent life science industry. However, in the traditional approach, decisions are made only once complete data is available and when this results in failure, the executives are replaced (Blank, 2013).

This brings us back to the importance of learning and adapting to changing requirements that are emphasized in the lean approach. Why should we terminate someone's employment who now has a better understanding on what went wrong and why, and replace him or her with someone who is less informed about the decisions and consequences that occurred in the past in the context relevant to the organization?

By applying a lean startup approach from the beginning on in the development of new business, the likelihood of detrimental failure decreases, since extensive learning within an organization occurs, which enables the understanding to apply the necessary changes to the offering on an ongoing basis with continuous testing with actual customers (Hoyer et al., 2010; Müller and Thoring, 2012; Blank, 2013; Cook, 2008; Witell et al., 2011; Ogawa and Piller, 2006; Furr, Dyer and Christensen, 2014; Chen, Damanpour and Reilly, 2010; Ries, 2011).

2.4 Literature Synthesis

Taking into account the literature on the topic of using the lean startup approach in understanding the customer and end user, in order to develop learning within the case product team and the case organization in the context of their new business commercialization initiative, the following framework has been created to guide this study. A synthesis of the literature review is provided thereafter, which follows the structure of the theoretical framework.

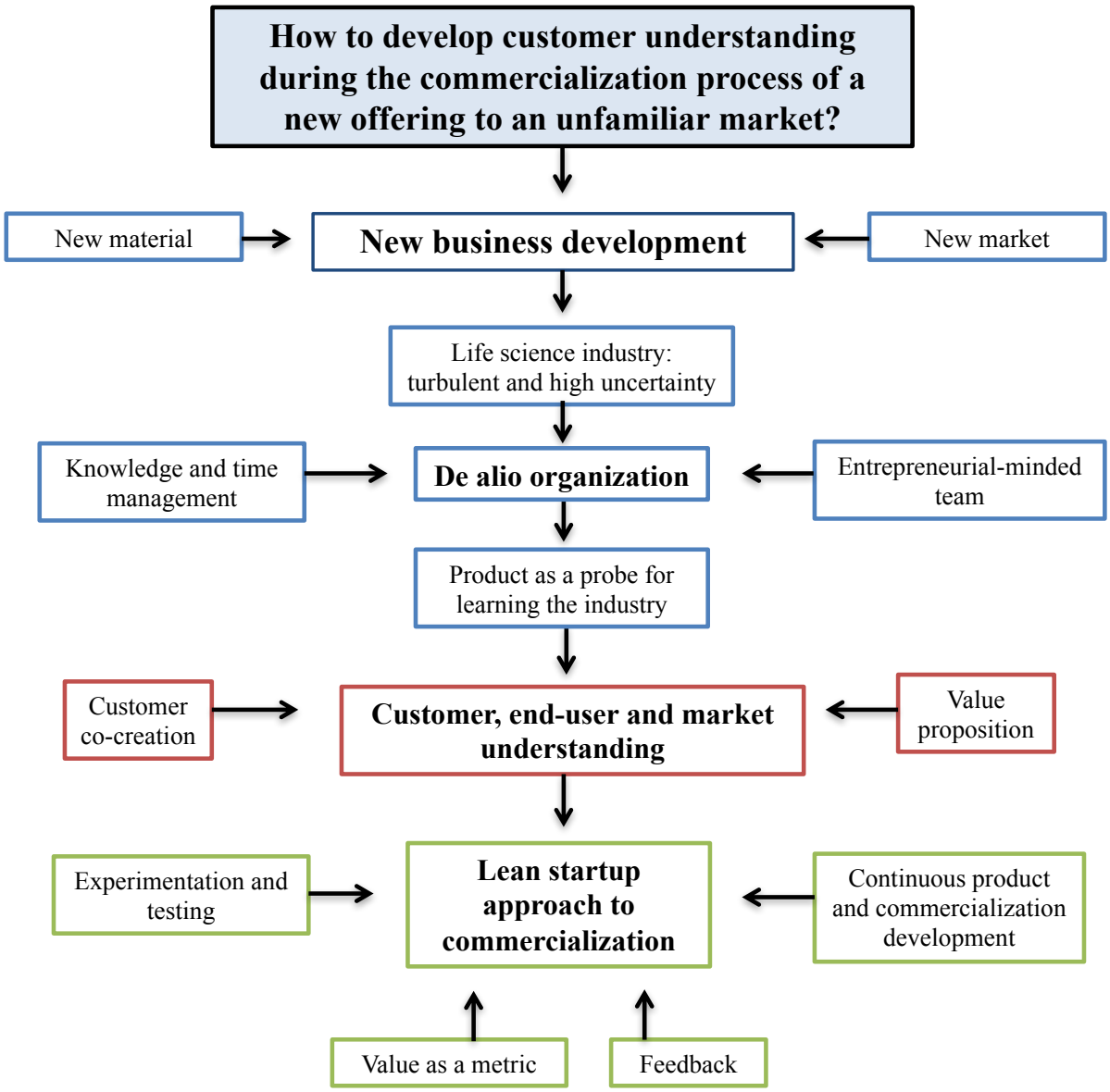

Figure 9: Theoretical framework

As presented in the literature, many authors – such as Berends et al. (2007) and Furr, Dyer and Christensen (2014) – emphasize the importance of continuous development of new businesses on the side of current operations in order to compete in the international business world. When thinking about the life science industry targeted by the case product team, this market is one of the most turbulent and involves a lot of uncertainty in many aspects. Developing learning becomes essential in such new business ventures where the target market is unfamiliar for the case organization. This kind of learning should begin from understanding the customer's business along with what the end user's needs of the product are. The lean startup approach is deemed as a method that can enable the whole commercialization process

of a new offering to an unfamiliar market to be more efficient than the traditional methods, as it involves quick experimentation, learning and pivoting accordingly.

Consequently, it becomes critical to develop the knowledge creation and management methods within the team as a whole to learn the ways of the market. This can form a source of competitive advantage as stated by Berends et al. (2007) and Lynn, Skov and Abel (1999), especially if combined with a probe-and-learning approach as emphasized by Chen, Damanpour and Reilly (2010). As with the case product team, even though the product may not have the features of a radical innovation, it is still rather complex for the team as well as the organization, as they are not familiar with the new target market. Therefore, as stated by McIntosh and Taylor (2013) and McLaughlin, Bessant and Smart (2005), by developing more knowledge about the field and thus the overall innovation process that occurs within the market, the case organization can move more towards incremental and routine-like management of the new venture.

Creating an entrepreneurial mindset within an organization can help with the learning process as stated by Baron (2006), Furr, Dyer and Christensen (2014), Bonabeau et al. (2008), Lynn, Skov and Abel (1999) and Chen, Damanpour and Reilly (2010). Fast experimentation and learning is further emphasized by Hutlink et al. (2000) and Cooper et al. (2004), who find that focusing on rapid experimentation and commercialization is more profitable than focusing merely on the budget aspect. However, a budget is still there for a reason and therefore, by better understanding the customer's business, the more likely it is for a new business development team to stay within the initially set budget.

As customers have become more empowered and demanding (Hoyer et al. 2010; Furr, Dyer and Christensen, 2014; Ulaga and Chacour, 2001), the more important it is to develop offerings that provide true value for them. With regards to the life science industry and the specific sector within it, there are no shortcuts, as the customers require the product to function in complex research. Enkel, Perez-Freije and Gassmann (2005) and Furr, Dyer and Christensen (2014) emphasize the importance of identifying and creating customers, which are essential in new business commercialization. Once it is clear who the customers are, co-creating the offering with customers can enable for an in-depth understanding of the customer's business and the processes involved in their daily operations (Alam and Perry, 2002; Callahan and Lasry 2004; Gustafsson et al. 2012). Gustafsson et al. (2012) and Witell

et al. (2011) emphasize the importance of the extent and quality of communication in such collaboration initiatives.

Customer co-creation can provide organization with immense benefits, such as decreasing the possibility for product failure, entering a market more rapidly, exploring further applications for a product and providing a 'closer fit' with the needs of the customer or end user (Hoyer et al., 2010; Cook, 2008; Ogawa and Piller, 2006; Fang, 2008; Joshi and Sharma, 2004; Sawhney et al., 2005; Grewal et al., 2006; Muniz and Schau, 2005; Xie et al., 2008). Overall, customer involvement in the product and commercialization development process allows for the formation of a clearer value proposition. In the end, the customer or end user is the only source that is able to determine the true value of an offering (Furr, Dyer and Christensen, 2014; Blank, 2013; Witell et al., 2011; Piller and Walcher, 2006). Co-creation is one important method to develop an offering, but the lean startup approach, which focuses on quick experimentation with actual customers or users, enables an organization to learn in the actual commercialization process.

The lean startup approach allows an organization to develop a proof of concept not only of their product, but also of the overall commercialization and business assumptions that they may have regarding the offering (Müller and Thoring, 2012; Blank, 2013; Furr, Dyer and Christensen, 2014; Witell et al., 2011). In other words, it can be considered a problem solving tool (Furr, Dyer and Christensen, 2014). The lean startup approach allows for the organization to gain valuable feedback to modify the offering accordingly and determine whether there even is a demand for the offering (Müller and Thoring, 2012; Blank, 2013; Furr, Dyer and Christensen, 2014; Witell et al., 2011). This in turn allows for the deeper understanding of the customer's business and thus, pivoting the overall operations according to the reactions and feedback of the customers. This should be a careful consideration with the case product team, as it is an unfamiliar market that the case organization is attempting to enter altogether.

The lean startup approach is a continuous process that requires constant experimentation with the customer, in order to keep up with the customer's changing needs as the market evolves (Müller and Thoring, 2012; Witell et al., 2011; Furr, Dyer and Christensen, 2014). This kind of experimentation and validation also affects the overall learning process within the case product team (Berends et al., 2007; Chen, Damanpour and Reilly, 2010; and Lynn, Skov and Abel, 1999) and can even enable the team with finding other suitable application for the

product (O'Connor and Rice, 2013). Most importantly, it can help with finding the most successful product commercialization model into the unfamiliar market (Khanna et al., 2015).

When developing a new offering, the traditional financial reporting metrics should not be emphasized, but focus should rather be put on aspects related to the value and potential of the offering within the market (O'Connor and Rice, 2013; Müller and Thoring, 2012; Blank, 2013). This information is best found from the customers and users themselves. As emphasized by Berends et al. (2007), Furr, Dyer and Christensen (2014), Chen, Damanpour and Reilly (2010), and Lynn, Skov and Abel (1999), when uncertainty is involved in the commercialization process of a new offering, the traditional management practices are no longer sufficient. Managers should rather work as facilitators of numerous experiments together with their team and let the data determine the next actions to take (Müller and Thoring, 2012; Blank, 2013; Furr, Dyer and Christensen, 2014). Witell et al. (2011) emphasize the use of a proactive approach to better understand both the customer's explicit and implicit needs of the offering, which highlights the importance of learning and understanding the customer's business.

3.0 Methodology

This chapter introduces and explains the nature of this study. The chapter begins by introducing the literature for the use of a qualitative research method. The literature regarding the case study theory is presented thereafter. This is followed by the data used for the study, the collection method and the analysis method used. This leads into the ontological and epistemological considerations. Lastly, the validity of the study along with any ethical concerns are presented.

3.1 Research method

This study is one of three Master's Theses that is being done for the case company in question and focuses on understanding the importance of including the customer in the new business development process. The other two Master's Theses are concerned with partnering and the use of business models within the life science industry. As this Master's Thesis, along with the two others, is conducted as a case study for a multinational organization that is commercializing a new product to a market that they have little knowledge of, a qualitative

study is able to provide more relevant data compared to a quantitative study. In addition, as the industry is unfamiliar to the researcher as well, a qualitative study allows the researcher to understand the market better altogether. This will then enable the researcher to make viable conclusions from the empirical data collected.

The topic involves complex matters that evolve around customer and market understanding, which need to be interpreted and analyzed thoroughly, further emphasizing the use of a qualitative research method. As stated by Eriksson and Kovalainen (2008), when aiming to create a deeper understanding for an area such as that considered here, a qualitative study becomes the optimal choice.

When conducting a qualitative study, interviewing relevant stakeholders is often most applicable. This was the case here as well and therefore, interviewing various players within the life science industry, along with other relevant stakeholders within the case organization, was deemed as a suitable approach.

3.2 Case study theory

Yin (2009) outlines four main strategies for analyzing case study evidence – relying on theoretical propositions, developing a case description, using both qualitative and quantitative data, and examining rival explanations (p. 130-133). The first strategy, relying on theoretical propositions, is the most relevant for this research, as according to Yin (2009) it is more preferable than developing case descriptions and the other two are primarily for more advanced researchers. Furthermore, as I am pursuing to develop the understanding of how to use the lean startup approach in new business development within a multinational organization, the backbone for this comes from the literature. Lastly, Yin (2009) states that when studying "how" aspects within a research, this method becomes very useful. However, additional procedures are needed to conduct a thorough qualitative study.

From the five analytic techniques described by Yin (2009), the explanation building is of most relevance to the present research question, as the study aims to provide suggestions to "how" the lean startup approach should be used in new business development initiatives within a multinational. By using explanation building, I will be able to establish what the interviewees find as relevant aspects in new business development along with the use of the

lean startup approach in new product and service development. This will then lead to the thematic analysis of the data.

By using thematic analysis, I will compare the answers from the interviews to define certain generalizable similarities and differences that are emphasized for new business development and the use of the lean startup approach in the process. By using multiple employees and managers from the case company will allow for a thorough analysis of the new business development process within the multinational, the use of the lean startup in their new products and services, along with where some improvements could be made. The other interviews conducted outside of the company with players that are relevant to the new target market of the life science industry will allow for a better understanding of how the same aspects are and should be conducted when entering the market. There are several steps that I need to consider when analyzing data using a thematic approach.

Braun and Clarke (2006) describe how "thematic analysis can be an essentialist or realist method, which reports experiences, meanings and the reality of participants" (p.9), which bonds well with my research questions. As stated by Aronson (1995), thematic analysis allows us to recognize certain patterns and themes in behavior, which in this case are the experiences of various players in new business development and the use of the lean startup approach. This in turn will allow for the explanation building of the findings.

Aronson (1995) and Braun and Clarke (2006) state that the first step in the process of thematic analysis is getting to know the data, which includes the transcription part of the interviews. The next step is to create the codes, which may however, be changed later on along the process (Braun and Clarke, 2006). The following step is to create groups of the codes or fragments that associate with one another (Braun and Clarke, 2006; Aronson, 1995). The codes may seem meaningless standing alone, but grouping them into these themes makes it easier to determine the patterns within the data (Aronson, 1995). Once the themes have been selected from the initial group, the chosen themes are clearly defined and named (Braun and Clarke, 2006). This brings us to writing the actual report from the chosen themes in such a way that it is understandable to the reader (Braun and Clarke, 2006). Along the writing process, reasoning for choosing certain themes need to be provided, which is done by reflecting on the existing literature (Aronson, 1995). By connecting the themes with the literature allows for the results to gain credibility by the reader (Aronson, 1995).

3.3 Data and analysis

Figure 9 outlines the 24 semi-structured interviews conducted for the commercialization project of the multinational organization. The length of the interviews ranged from 30 minutes to 90 minutes with most lasting closer to 60 minutes.

These interviews were conducted by the researcher and the four other members of the commercialization project. Often two or three members of the commercialization project team were present at the interviews, but sometimes these were done individually between one member of the project team and the interviewee. The style of the interviews was semi-structured following certain topic areas and questions. This made the interviews rather conversation-like to let the interviewee and interviewer discuss anything that may relate to the question at hand.

The senior manager of the product team was interviewed first in the beginning of the project and again towards the end in order to gain a better understanding of the progress made during the seven months and the state of the current situation. These interviews were conducted in Finnish and in English, and consisted of various individuals within the case company – both the larger organization and the product team – along with researchers, suppliers, startups, network founders, product and service providers, and professors.

These interviews were recorded and then sent to Tutkimustie Oy for transcription. Due to the amount of data, along with the interviewees wanting to preserve their anonymity, the transcriptions of the interviews are not provided in this Master's Thesis as appendices. However, any sections used in this research will be available upon request.

The following table provides the title, organization type, interview date and language of the interviews. The "(case)" simply refers to the organization and product team in question.

#	Title	Organization type	Interview date	Interview language
1	Senior Manager, Business Development	Product team (case)	7.12.2015	Finnish
2	Development Engineer	Product team (case)	7.12.2015	Finnish
3	Director, Strategic Partnerships	Multinational organization (case)	12.2.2016	Finnish
4	Business Development Specialist	Product team (case)	12.2.2016	Finnish
5	Vice President	Multinational organization (case)	15.2.2016	Finnish
6	Professor of Practice	University and Multinational organization (case)	9.3.2016	Finnish
7	Senior Manager	Multinational organization (case)	11.3.2016	English
8	Application Scientist	Product team (case)	15.3.2016	Finnish
9	Vice President	Multinational organization (case)	21.3.2016	Finnish
10	Director	Multinational organization (case)	22.3.2016	English
11	Senior Manager	Product team (case)	4.4.2016	Finnish
12	Assistant professor	University	26.4.2016	Finnish
13	Professor of Practice	University	9.5.2016	Finnish
14	Professor	University	11.5.2016	Finnish
15	Manager	Supplier	12.5.2016	Finnish
16	Managing Partner	Business development service provider	19.5.2016	Finnish
17	Researcher	University and Network	23.5.2016	English
18	CEO	Supplier	25.5.2016	English
19	Founder / CEO	Product company	25.5.2016	English
20	Sales Manager	Service provider	29.5.2016	Finnish
21	Founder	Products and service provider	1.6.2016	English
22	Senior Manager, Business Development	Product team (case)	23.6.2016 2nd interview	Finnish
23	Researcher / Life science specialist	Products and service provider	28.6.2016	Finnish
24	Consultant	Consulting service provider	29.6.2016	Finnish

Figure 10: Interviews conducted for the commercialization project

As the interviewees had various backgrounds and thus, were not all directly linked to the life science industry and the sector at hand, the questions were modified according to their respective strengths. The interviews covered the following topic areas: new business development at the case organization, specific new business development relating to the case,

specific technology market relating to the case, specific technology within the life science industry, customers within the specific technology industry, case product, the lean startup approach and co-development with customers, competition within the industry and business models. Appendix A provides an outline of the most common questions asked, which are of relevance for this research study.

In the Empirical findings section 4.0, pseudonyms are used for each of the interviewees in order to help the reader understand which statements are made by the same person. The following pseudonyms are used and are presented here in alphabetical order: Anneli Anttonen, Benedict Buffer, Carolina Cray, David Donaldson, Eve Elder, Frank Fredriksson, Gary Grass, Hanna Huhtamo, Ismo Ilmarinen, Jaana Jarmonen, Kamilla Kummanen, Lauri Länkinen, Mikael Markkunen, Nico Nachtmeier, Olivia O'Sullivan, Petri Penttinen, Quinn Quick, Ralf Richter, Santeri Solinen, Timo Talvitie, Valeri Vaughn, Werner White and Zack Zareen. Even though 24 interviews were conducted, a total of 23 pseudonyms are used, as two of the interviews were held for the same person. These pseudonyms have randomly been selected for each of the interviewees to retain their anonymity.

3.4 Ontological and epistemological considerations

With regards to the ontological and epistemological positions, this study will follow the position of critical realism from the ontological side and the substantialism from the epistemological side. Referring to the example given by Eriksson and Kovalainen (2008) "If you are interested in studying what managers do and why, you must first decide whether you believe that they act, for instance on the basis of biologically determined personalities, cognitively adopted attitudes, or socially constructed identities" (p. 14), which can applied to the research topic at hand – how multinationals are developing new businesses and whether they comprehend the importance of customer understanding in the commercialization process. Consequently, I believe that both materialistic aspects and the social interaction primarily influence the new business development process, and therefore, this is the basis for the formation of their respective social reality. Furthermore, as certain aspects of the companies can be seen as material, a substantialist approach implies that these can be interpreted differently depending on the context, or in this case the project, being discussed in the interviews (Eriksson and Kovalainen, 2008).

3.5 Validity and ethical concerns

As stated by Lincoln and Guba (1985), a qualitative research is evaluated beginning with the *validity and credibility* aspects. By using numerous sources for the literature review part, which forms the basis for my theoretical framework along with 24 interviews conducted for the commercialization project, allows me to make a careful analysis of the research questions. The *reliability and dependability* aspects require me to be thorough and consistent with the research (Lincoln and Guba, 1985). By making informed choices regarding the theory and the sections of the interviews used in this study, along with explaining my reasoning, without forgetting the big picture of the research study, I am able to provide a reliable and dependable research study.

The third assessment criteria, *generalizability and transferability* (Lincoln and Guba, 1985), is valid for the most part, as other de alio multinationals will be able to use the data collected and thus, the results on a general level for their new business initiatives into the life science industry. The last criteria that I need to take into account is the *objectivity and conformability* aspect (Lincoln and Guba, 1985). By explaining my background, along with the interpretation of the literature and the findings, will inform the reader of my possible prejudice regarding certain decisions. However, by relying on the in-depth literature review, I will convince them of logical interpretation of the findings and my arguments without being prejudiced. This general evaluation of the research study brings us to the ethical concerns that need to be considered during the study.

Eriksson and Kovalainen (2008) provide us with various ethical guidelines that need to be considered during any research study. Beginning with the *informed consent* (Eriksson and Kovalainen, 2008, p. 71), which emphasizes the importance of the interviewee, in this case, participating in the interview voluntarily. This is an essential part, as some of the interviewees can be considered as competitors of the case organization and therefore, need to be made aware of the situation. I will need to inform each of the interviewees about the research purpose along with receiving their approval for the interview, its recording and transcription.

The following part is *professional integrity* (p. 72), which describes the academic and open format nature of the research. In other words, once I have completed the research, I need to argue for the logic behind my analysis and make it available to others (Eriksson and

Kovalainen, 2008). This is rather given, as the Master's Thesis will be made public regardless. The third point, *research should not bring any harm to participants,* is mainly concerned with medical and psychological research (p. 72). However, as stated by Eriksson and Kovalainen (2008) it is extremely important to respect and protect the "integrity and confidentiality of the data generated by the research" (p.72). Furthermore, one of the main priorities within research is respecting the anonymity and privacy of those involved in the interviews, if this has been agreed upon from the beginning of the interview with each person and company (Eriksson and Kovalainen, 2008). Respecting their privacy is as important as giving credit to the work done by others as discussed next.

The ethical concern of *silencing* and the more severe case of *plagiarism* (Eriksson and Kovalainen, 2008, p. 75) need to be carefully considered in academic research. These are somewhat similar issues, but silencing mainly relates to the aspect of not giving credit to researchers who have already covered a similar part that you are writing about, even if you are not reflecting to their work directly (Eriksson and Kovalainen, 2008). Another relating aspect to this is not giving credit to others involved in the research when publishing the work (Eriksson and Kovalainen, 2008). Plagiarism, on the other hand, is seen as something even more serious – presenting someone else's work as your own is considered an intellectual crime in most countries, even though within the research community it is more often thought of as an ethical issue (Eriksson and Kovalainen, 2008). Consequently, to give credit to the sources that I will use throughout my master's thesis research study, I will be extremely careful with regards to citing the work of other researchers to avoid silencing and plagiarising.

4.0 Empirical findings

This chapter presents the empirical findings of the 24 interviews conducted for the commercialization project of the multinational organization. As the primary purpose of the interviews was to better understand the life science market, along with the commercialization of new products within this market, the interviews covered numerous topics and therefore, only the themes that are relevant for this Master's Thesis will be presented. This chapter is structured by first presenting the findings related to new business development, which is followed by understanding the customer's business and the use of the lean-startup approach in the commercialization process. A summary of the empirical findings will be presented after

presenting each of the aforementioned sections. It is important to note that as most of the interviews were conducted in Finnish, some of the used direct quotations will be translations from the original. As stated earlier, pseudonyms are used for each of the interviewees in order to help the reader understand which statements are made by the same person.

4.1 New business development

Before narrowing down on the customer understanding and the lean startup approach in new business development, the following begins by establishing a brief description of which criteria the case organization uses to seek for new business opportunities and what the management considers in such situations. This is followed by understanding the importance of learning about a new market early on and how a product can be used as a probe for learning about the unfamiliar market. Aspects related to accounting for the time factor is presented thereafter and lastly, establishing presence within the new market through networking and personal relationships.

4.1.1 Criteria used by the case organization for entering a new market

When a de alio multinational develops new businesses to accompany their ongoing operations, there are numerous factors that need to be considered. Beginning with analysis of wide trends that could accompany the ongoing operations of a de alio organization. This can be determined using certain criteria, which has been developed through careful consideration within the company. After narrowing down to a certain market, applications within the sector should be analyzed in order to select areas that show the most potential for the organization to develop a viable business.

Developing something completely new can be a challenging process, but as stated by the management of the multinational, by following wide trends that are happening within the industry and possibly those that are linked to it can be a useful strategy. In addition, being proactive with developing new areas that comply with the organization's vision can be rewarding. This is demonstrated in the following quotation by case organization manager Ralf Richter.

> *We constantly monitor and follow what is happening in the world, in Finland and the EU. Mainly monitoring of these trends [so-called] megatrends. We try to stay on track*

about what is going on [in the world]. However, we not only follow, but in my opinion the case company has been this kind of a pioneer in many new areas that are developing.

- Ralf Richter

After a corporate venturing unit within the case organization was driven down, the management began to look at new opportunities from a different perspective. A criteria was formed by one of the new business development managers, Ismo Ilmarinen, which consisted of a strategic fit, a scope fit, a scale fit and a timing fit. These four factors were then used to determine whether certain new offerings would be pursued further. How and why the case organization came to these four factors is explained by Ismo Ilmarinen in the following detailed quotation, in order to present the process of the revised criteria.

We began to look at things from new angles and which things would [have] a strong fit, so that there would be a clear rationality to why [the case organization] would pursue and develop such new businesses. It began from that there needs to be a strategic fit, sits in the with the [case organization's] vision. Then I spoke about scope fit, which means that it builds on the [case organization's] platform, whether this is a knowhow or a physical platform that we have. In order for it to have a certain existing solid foundation on which we build the new [offering], and the new [product] benefits from either the knowledge, capability or the manufacturing infrastructure. Then the scale-fit, meaning that if not in the short term, at least in the medium term there seems to be something there that makes it relevant [scale-wise] for [the case organization]. Then fourth, I spoke about the timing fit. We are not a university, meaning that we can't do things that may become a first product idea in [say 10] years.

- Ismo Ilmarinen

When the aforementioned four criteria were met, the organization would move on to the application part within the new market. However, finding the most suitable application for a new material can often be challenging. Case organization manager Mikael Markkunen proposes the use of three criteria: size of the industry, rate of adoption and synergy with the case company.

Maybe even in hindsight, sometimes you do it not even so much on a rational basis, but more [by] following your instincts. And then you post-rationalize in a way. But basically, I would say three criteria were the most important ones: (size of the industry, rate of adoption and synergies with the case organization).

- Mikael Markkunen

Large multinationals naturally also often want the new business to be of relevant size compared to their overall revenue. In addition, new ventures – whether products, services or completely new solutions – have to align with the overall mentality or strategy of the company. This is explained by case organization manager Frank Fredriksson.

> *There is this certain criteria, which it needs to have that makes it suitable for this [case organization's] strategy, has a certain revenue volume expectation, and we would like it to fit with our raw material streams of course, potentially with our integrates.*
>
> *- Frank Fredriksson*

However, in some cases, organizations may overlook such criteria for the time being, but the link should still be found at some later stage.

> *Then when such pearls such as the [case product] arise, where there are some kind of great [industry] applications, these then need to be looked at on a case by case basis of course.*
>
> *- Frank Fredriksson*

As noted, the case organization follows megatrends around the world in order to match them with some specified set criteria in the new business development process. When an idea has made it past these stages, learning about the new market through the new product becomes essential, as there are often various aspects that the management of even a large de alio organization may not have thought of, especially when it is a case of a manufacturing organization entering the life science industry. This learning can then be applied to other new business initiatives within the organization.

4.1.2 New product as a probe for learning

New business development within the de alio case organization can also be viewed as a probe for learning about the various aspects that need to be considered when entering a new and unfamiliar market. Having a certain flexibility and openness with regards to the new market is essential, as the business is unfamiliar to them and therefore, there is an immense amount of information, skills and knowledge that has to be built to succeed. By knowing how to enter into one market can enable the organization to develop knowledge and skills, which can then be applied to new business initiatives within the same industry or even other unfamiliar markets.

As the case company has traditionally been operating in a business-to-business environment, they already have certain knowhow within the organization that can be used when entering the new market. However, developing something to a market with a different context, such as that of the life science industry, can create immense challenges for the company. It is no longer possible for them to operate in a similar manner in all aspects as in the other markets that are known to them. According to the management, when entering a new market, an area of development is that the company should be more flexible and be able to learn the business environment and the value chains within it through a faster process somehow.

> *Something that could be developed is of course the flexibility to learn new business environments. That is, to identify those practices out there, what are the rules of the game and how the value chains are created.*
>
> *- Ralf Richter*

According to Anneli Anttonen – who has an extensive new business development background – sometimes it can be better to wait for the market to grow and the technologies to develop before entering this new field which the company has little knowledge of. Being a pioneer within a new field can become extremely expensive as seen with example cases such as Philips in the electronics industry – others will be able to copy your innovations even around patents.

> *We currently have a lot more knowledge in the world, for example of raw material chemistry than what we had 10-15 years ago. It may be that this wasn't so bad after all, we made a choice to wait, in order for the knowledge to grow. This enabled the technology readiness level to go up, which allows us to take things as they become ready, and look at what we can do by combining our own expertise. [Consequently,] not be the first out there trying.*
>
> *- Anneli Anttonen*

Even though large organizations can be rather clumsy and slower to react to changes compared to startups, there are certain advantages that arise. As stated by case organization manager Ismo Ilmarinen, the mentality within the company has been shaped throughout the past 100 years to be more focused on doing a few number of things correctly, rather than attempting all kinds of things and hoping that some of them will work out. However, the new

initiative into the life science industry can be one way for the organization to develop its mental flexibility to learn how commercialization should be done into unfamiliar markets.

> *Maybe our advantage is the fact that since we are such a capital-intensive company, [and] have been [around for a very long time], our philosophy is built through it. [Meaning that] it's better to do things carefully and well, which are then more likely to be successful, compared to the Wild Wild West, shooting here and there and trying this and that.*
>
> *- Ismo Ilmarinen*

According to professor Gary Grass, it is extremely difficult to do new things in industrial organizations, because they are used to developing their current operations to make them more efficient, which then allows for cost savings. The development is very incremental in such organizations, meaning that there is very little 'new' kind of thinking in a way according to professor Gary Grass. However, the professor gives a few examples of organizations that have been able to rethink their business offering at the same time with their business model. By developing innovative business offerings often requires the company to learn how they are able to fulfill such initiatives for their customers. These are shown in the following quotation.

> *Another example is this [company called] Kemppi, which provides welding equipment and has tried to develop something new. They have these welding sensors that can measure the quality of the welding mark, which allows them to promise customers that "now this is good quality". They have a joint venture with Manpower, which is Welding as a Service, so they rent or sell welding. For example, when someone has to weld two meters.*
>
> *- Gary Grass*

This example shows how Kemppi has completely relearned the business model and not just being another company out there providing welding services. However, rethinking an existing offering and business model is often not a fast process, as it requires a lot of testing and analysis. With regards to the case product team, a clear business model has yet to be developed. In addition, the whole life science industry is unfamiliar to the case organization and it is evolving rapidly. Consequently, it is important to account for the time factor of the learning curve.

4.1.3 Accounting for the time factor of the learning curve

When developing new businesses for an unfamiliar market, it is essential to understand the phase of the market along with potential changes that may occur in the near future. Case organization manager Ismo Ilmarinen emphasizes the importance of understanding the life cycles of products within markets and that when entering a new market, these life cycles may be completely different from what you are used to in the field that you are currently operating in. Especially when a field is highly technical, the developments can occur at a tremendous pace, which in turn can result in making your innovation obsolete. Disruptive technologies or innovations can have an immense impact on a market or an offering within it and therefore, it is important to take these into consideration when planning on entering a new field with a new offering. Through better understanding the market and the customer along with close collaboration with various stakeholders, especially with customers, enables an organization to move along with the market and learn what changes may occur that need to be considered.

One of the main things when developing something new is to get everything rolling and moving forward – market penetration in a way. This is where time and team members come to play an extremely important role as stated by case organization manager Ismo Ilmarinen. Time is often limited due to the expectation of the upper managers and the possibility to keep burning money and taking up resources without actually bringing anything in. In addition, the target market that you are aiming for may not remain there for long, which can make most or all of the R&D work obsolete. Consequently, emphasis should be put on experimenting and close collaboration with customers and the end users. The following statement by Ismo Ilmarinen sums up the importance of the time dimension.

> *When you are aiming for something somewhere there [in the market]*, and *then when you are already half way and notice that [the market] doesn't exist anymore, the market has already changed. So [in other words,] understanding the time perspective is important, so that you don't shoot too far for some goal that doesn't exist after you've reached the halfway mark.*
>
> *- Ismo Ilmarinen*

Overall, even if the team does everything correctly, because of the learning curve involved, entering a new market will always take time. Therefore, gaining market access in some form early on is vital, as it enables an organization to learn about how value can be created for the customer and the end user.

Then also the fact that the learning curve is quite harsh. This should not be underestimated and therefore, it's advisable to gain some kind of a market position as soon as possible.

- Ismo Ilmarinen

Narrowing this down, the time factor is also essential in the life science industry to which the case organization is currently commercializing their new product, especially when thinking about the product features. This is also a reason that makes it demanding to get new innovations through within the industry, as there are many aspects that change and have to be taken into account by the companies. This is explained in the following statement by life science industry company founder Jaana Jarmonen.

[Innovation within the industry] is awful. In the sense that people are in general, very heavily swayed by what they read in publications. So the cycle goes round and round. There's only a relatively small percentage of people who are interested enough in those specifics that they'll really go out and try completely different new things.

- Jaana Jarmonen

Organizations need to understand that in this specific sector within the life science industry, the customers and end users, want the products and materials to function quickly and in the correct manner, in order for them to be able to move on with their work. This is stated by company founder Jaana Jarmonen.

In general, it all comes down to a time factor. They just need the method to work quickly, so that they can move on to the things from which they will get their publications from. So [this is why] I'd say for 90 percent of people, these are tools and methods, which they just need to work quickly. [They often] read it in a publication and say, "Right, I'm just going to do that exactly the same way, and hopefully it will work in the same way first go, so that I can do my experiments and get a publication in."

- Jaana Jarmonen

Therefore, by working closely together with the customers and end users, organizations are able to learn about the issues that these people may have with current products, which they can then adapt to be used in their new product and hence, create more value. Having a close collaboration and communication relationship with customers allows for feedback and learning to flow between the two parties for a more efficient development process.

As can be noted, time is a very limited and thus, an expensive resource within the life science industry, from both an organization's as well as the customer's or end user's perspective. This then links time closely together with the more physical resources, such as employees. According to case organization manager Ismo Ilmarinen, the capability of people is by no means linear, but can be completely binary – one person can get a job done and the other one is unable to. An organization, or even a team, needs to find people who are sort of 'entrepreneurial hunters', as mentioned by Ismo Ilmarinen.

> *The longer I've done this, I've come to the conclusion that different people's capabilities are in no way linear. On some assembly line, it can be that someone is five percent more effective and another one is 15 percent more effective. But here it can be one hundred percent binary. If someone can't get something done and another person can, the it is quite fundamental that you have the right people.*
>
> *- Ismo Ilmarinen*

Overall, the importance of learning about the new market early on is essential for both de alio organizations and startups developing new offerings. Through close collaboration and communication with the various stakeholders, especially the customers and end users, within the life science industry, an organization is able to remain dynamic and adapt accordingly to the changes occurring in the market. An important aspect with entering a new market is establishing presence within the new market through networking, as even a large de alio multinational is likely not known by anyone within the market.

4.1.4 Establishing presence in the new market through networking and personal relationships

When a de alio organization enters a new market, it is likely unknown within the industry, which can be considered a critical disadvantage, especially when companies rely on a strong network base. Consequently, the case product team needs to begin establishing presence early on during the commercialization process. By attending industry events for networking purposes and contacting potential future customers or partners – either directly or through already existing personal or organizational networks – the new product team within a de alio organization is able to begin establishing presence in the new market.

According to founder Eve Elder, operating a company in the specific sector within the life science industry, it was very beneficial for them to attend various events to learn about the market and discuss their potential offering, even before they had a prototype ready. This allowed the company to begin establishing valuable connections that could then lead to collaborations in the future. Eve Elder emphasizes that it is essential to begin creating the network and capturing feedback on the initial idea as early as possible, as the commercialization process will take time regardless. This aspect is also mentioned by the management of the case company, where manager Mikael Markkunen states that it is important to begin talking to people and various stakeholders within the field, as success is often about the relationships you build, and even about coincidences. Keeping things a secret will no longer work, as a new company needs to establish their presence within the market early on before it is too late. Another case organization manager, Nico Nachtmeier, states the following on the same matter.

> *We don't have any customers, but again it's pre-commercial. Yes, we are talking to many chemical companies. We are talking to chemical distributors, we are talking to brand owners at the end of the value chain, trying to cover the entire value chain. We want to create the pull of course. We want to create the demand in the market.*
>
> *- Nico Nachtmeier*

Beginning to learn about the market early is also viable from the perspective of developing knowhow and collecting data, which can then be used if and when the commercialization stage becomes more relevant, as stated by one member of the case product team. As the specific market within the life science industry is also still evolving, if a breakthrough does occur, the case product team will be better prepared to take advantage of the situation regarding the overall commercialization process.

Contacting and discussing the offering early on is further emphasized by the following statement by CEO Timo Talvitie of a life science industry company.

> *That's my (recommendation) to all companies I've worked for. Companies should talk to companies from the first second, to know what they'd like to get, so that we can get our production developments (to their needs).*
>
> *- Timo Talvitie*

However, when talking to these potential customers about the idea, it is important to remain humble as demonstrated in the following quotation.

> *You should talk to companies, but not tell them that "we have the solution for everything". I think it's better to go, "we have an idea", to see how they react and get their feedback to develop the systems further, or adapt the systems to their needs.*
>
> *- Timo Talvitie*

Learning about the market first-hand has also been key in another new business venture, which is described by David Donaldson of the case product team. By talking to the various stakeholders that can have an impact on the purchase decisions allows for the case organization to improve their understanding of the customer's needs. This in turn will create these initial contacts within these potential customers, which can help with forming long term relationships and thus, allow for current and additional product development to meet the customer's needs.

> *[We have] directly been at [various locations], interviewing people and [companies or organizations]. Deepened [the general] understanding of what they actually want from our product, and how they should be approached, and how collaboration with them should to be done. So this is mainly about learning new things and how we can get in with a new product.*
>
> *- David Donaldson*

However, the setup in the specific application within the life science industry is not as clear, since the product needs to be explained and validated through various means beforehand to the various players involved, as explained in the following statement by a David Donaldson of the case product team.

> *In order to get, for example the big pharma companies interested, you have to be sort of in-between, balancing the academic side that produces the scientific research and at the same time contacting and discussing [matters] with the big pharma companies. And somehow we should be able to create some kind of a link between the two.*
>
> *- David Donaldson*

This then requires for the case product team to form wide networks as well as presence early on in the market, so that both the academic side, but more importantly, the customer side of big pharmas are more likely to hear about them in some form. When a company has already

heard about the case product team before they contact the company, they will have a better opportunity of moving forward with the company to selling them the new product.

> *[Being a moderator then] requires us to have ridiculously large networks towards the academic side. I feel that the groundwork with the individual researchers has to be well done, and we have to have a lot of them. [In addition,] the research groups have to be of high quality of course.*
>
> *- David Donaldson*

Being able to approach the big pharma companies with extensive groundwork is further emphasized in the following statement by founder Jaana Jarmonen of a life science industry company.

> *In essence, all of these collaborations in the [specific area of the life science] field, are about bringing in a new technology which is better, but that technology has had to have multiple (years) of development somewhere else before it's ready for pharma. So that's why it has to start with the small guys and then the small guys say, "look this is now more mature, it's been evaluated in a lot of ways and it's probably ready for your kind of industry usage". Then they try it and say "oh yeah that looks really good, let's work on it together now to fine-tune it".*
>
> *They're all just tools, which the companies use when developing their products. If the tools get better, then it's hopefully cheaper and faster for them to develop new products.*
>
> *- Jaana Jarmonen*

Consequently, as stated by Jaana Jarmonen, this is also related to understanding the customer's business and how the case product team is able to help the customer help themselves by providing products or services that are able to help the company develop their offerings further, hopefully faster and at a lower cost.

The management also believes that it is essential to begin building a network early on in the research field, so that collaboration can be done with others involved in developing the new business area. Furthermore, the traditional way of thinking where new developments are kept a secret no longer works either according to one manager of the multinational.

> *We constantly build networks here in the research world together with partners and customers. New development today is strongly based on building a network, so we're trying to do co-operation in the value chain. [In other words,] not do it alone here in*

our research lab, and then go to the market in a few years and see that the product doesn't work or that there is no business.

- Ralf Richter

The importance of the network is further emphasized in the early stages of new business development in the following statement.

When we got the material, we searched for small companies within Finland and brought the material there for testing. They then tested it and we got input from them and developed it there. That is important for the networking in the early stages, because we can't have [everything], and neither can we always have the knowhow. Here in our organization, not everyone can know how to do everything.

- Ralf Richter

Even though a multinational may be known in one field, when entering a completely new field that is not directly linked to the organization, players within the field will not know who you are and you do not know them. Being a large organization may help locally where people have heard about the company one way or another, but when going abroad, it is a completely different story. Therefore, business is often dependent on personal relationships and networks as stated by case organization manager Ismo Ilmarinen.

We are not known and nobody knows us, so it's construction from zero. However, business is primarily built on trust. Even if you speak about B2B or other kinds of circles, the importance of human interaction has a huge impact, and may be emphasized further in new things. It is that nobody will very easily change some fundamental component in their system.

- Ismo Ilmarinen

As mentioned by one of the managers, since the case organization is a global company, when new technologies or products are developed, they can be applied or commercialized all over the world. The target market does not have to come from the local area or even within the same continent where the offering is developed. This allows for the organization to take advantage of the already existing global work force or network so to say, even if the product were for a completely new market for the organization. Having some operation within a country or region can help with distribution for example.

Overall, in a large organization, such as the case company in question here, employees and managers have contacts to all kinds of places one can imagine, which can often turn out to be extremely useful. Consequently, the case organization or even just the case product team could form some kind of an internal database with each of their contacts. This could help with identifying potential partners or customers with whom to work together with in order to improve the understanding of the specific sector within the life science industry.

When a de alio organization begins establishing presence within a new market through various means such as networking, and personal or organizational relationships, they should also begin contacting potential customers to better understand their business and thus, their needs. Understanding the customer's needs and their business, which often involves the end user, the organization is better able to provide products that add value to their operations. Customers should also be closely involved in the product development from as early as possible in order for them to steer the offering in the right direction.

4.2 Understanding the customer's business

Before being able to develop a clear value proposition or even an offering that creates immense value for a customer, the case product team needs to understand what it is that the customer requires from the products that they use. The better the team is able to understand the customer's business, the easier it will be to determine which aspects of their product they should emphasize to the customer or end user, or how their current product needs to be modified to better meet these needs. One manner to develop this understanding is simply by selling the product, which allows for the customer to try it and hopefully provide some feedback on its usability. Another method to develop this is by thinking about – how can you help your customers help themselves? This in turn often requires in-depth understanding of the customer's or end user's processes, which can be recognized by involving them in product development.

4.2.1 Understanding the customer's and end user's needs

Customers play a fundamental role for any business, as they tend to be the main source of income. Therefore, understanding who the customer is, what they look for in a product or service, and how much they are willing to pay for it, are crucial questions that organizations

have to consider with both their current and new businesses. These then help with forming the foundation for the business model and the overall commercialization process that may work best within the new market. This is demonstrated in the following quotation by one of the interviewed new business developers.

> *[Business models are about] how to make money. If you think about the business model canvas or other structures, there are numerous elements that have to be considered. But I do think that the most important [aspect] is customer identification and the identification of the need that they have. [In other words,] customer need understanding, and finding [and developing] a value-adding solution to that need.*
>
> *- Anneli Anttonen*

According to case organization manager Mikael Markkunen, it is often not enough to just understand the closest customer's business and their needs, but also the business and needs of the customers' customers. Therefore, analyzing the value chain as a whole all the way to the end user, and then talking to the players downstream from the initial offering to understand what they care about. As stated in the following quotation, this has led the case organization to comprehend and better understand the reach of their customer's business, which can also help the case organization improve their understanding of their own business.

> *In essence, it is about a very profound insight about the business of our customer's customer. So we are going two steps forward in the value chain, and that has provided invaluable, insights, into the processes of our customers' customers, into the buying criteria of our customers' customers and certainly, into the markets of our customers' customers.*
>
> *- Mikael Markkunen*

The case organization manager, Mikael Markkunen, continues by stating that defining the customer early on is important, but should be carefully considered, as it may turn out to include more than what was initially thought. Looking at customers that are closest to you is not enough, as by understanding the following customers downstream can lead to increasing knowledge and thus, improve your business.

> *My recommendation always is to define customer as everybody downstream in the value stream. In other words, it's very much advisable to think not only in terms of customers, but in terms of value chains and to map all of the stakeholders, which are out there. I don't think it is sufficient and that's a mistake that is commonly made, just*

to work with the next guy in the value chain. This (alone) in our case has led to pure failure.

- Mikael Markkunen

As stated by a company representative, Eve Elder, within the life science industry, taking into consideration the final application for what the product is used is essential, as this is where the product will end up in the value chain. This emphasizes the importance of understanding the business of the customers' customers as stated before. Therefore, teaming up with professionals within this certain applications area becomes vital, as they are the ones that are able to inform you of the product requirements, criteria and their respective relevance. Such professionals can come from the academic facilities, but also from various companies operating within the life science industry. Even if in some cases the customer may also be the end user of the product, working together with professionals within a certain application area can enable the case organization to improve their business in both product development as well as customer understanding. These in turn can then help with the overall commercialization process.

Understanding the customer's business can also help with finding additional or better application for the initial product, as the first intended market is often not the best or last for that matter. As stated by one of the interviewees, Anneli Anttonen, with extensive experience in new business development, the most important aspect when developing something new is to understand the overall business from the customer's perspective – customer insight so to say. This needs to become insightful knowledge of the customer's business in order to understand what kind of value the case organization is able to bring. By understanding the links for the market segment can allow for better applications for the new business to be found.

Understanding the customer-side widely. Widely, because in the beginning, if we start with a completely new type of product, with new features, the market which is first determined as the end-use market for the product, is not the final one. It is the obvious case, but it's probably not the best with the know-how produced in-house. "What could [your] role be, and how is this value added with your product or service?" This is where it all starts from.

- Anneli Anttonen

According to one of the members of the case product team, Benedict Buffer, it would literally be "stupid" to begin guessing what the users and thus, potential customers of the product want from it. Therefore, the team has to be active with contacting the users to find out more about their needs. Furthermore, it is not enough that they find out information online or from a market report – the information has to come directly from the users or customers.

> *We attend fairs, contact companies whether we could visit them, so we try to listen to them and what they require or need. In any case, we should not try to guess what someone wants. I think it is (in every way) stupid. So we need more data. And not that kind of data that I can find online where someone said something, or some market report, so it should come directly from the users.*
>
> *- Benedict Buffer*

As stated by Benedict Buffer, the data needs to come from the users and customers themselves. Consequently, beginning to sell the offering is a valid method to gain this data and understanding.

4.2.2 Developing customer understanding through selling

According to manager Ismo Ilmarinen of the case organization, the most difficult aspect in the commercialization process is to actually sell your offering to the customers. This is mainly due to the fact that to whomever you are selling it to, the customer likely already has a functioning product or service from a competing company and therefore, switching-costs and risks involved with changing to your product need to be taken into account by the customer. Consequently, an organization needs to understand these aspects from the customers' side as well in order to know how they are able to convince the customers to purchase the offering. When better understanding the customer's business, the easier it is to develop and to provide them with a solution that takes into account the challenges and risks involved in switching to a new product. This is outlined in the following quotation by a manager of the case organization.

> *There must be a financial incentive that you will save [money], and you will save even after taking into account all of the costs related to switching the current model. Also, the saving versus the risk you take when you change something that works.*
>
> *- Ismo Ilmarinen*

When a company switches something in their products or operations, it often affects those both upstream and downstream the value chain – the companies that are providing you with certain materials or subcomponents will need to adjust accordingly, along with those you are providing your product with will likely also need to modify their operations. This can ripple down all the way to the end user, meaning that changing something that already works is extremely risky and requires time to be implemented throughout the value chain.

> *Then also there's the fact that our customer is rarely the end-customer, so if our customer wants to change something, he has to change something within his [internal] value chain, and this may need to be done again by those affected by these initial changes [all the way to the end-customer]. It just is that the dynamics involved with changing a product or a subcomponent of a product is surprisingly slow and risk-averse.*
>
> *- Ismo Ilmarinen*

According to manager Ismo Ilmarinen of the case company, when developing something new within a large organization, bringing together all the necessary resources around a new venture with the help of support functions is easy, as these things are still within the control of the organization. However, successfully commercializing the new offering is the main challenge, as that is the point when you no longer have control, as someone else – the customer – decides on whether your product is worth paying for. Therefore, it is important to begin contacting and selling the product to potential customers as early as possible in order to make adjustments when they are cheaper, and before too much damage has been done to the initial impression of the customers from using the product for the first time. It will difficult to turn around a bad first impression, as the customer may already have made up his or her mind. Consequently, by making adjustments early on with the help of customers can make the commercialization to the masses and more important customers more efficient and thus, more successful.

When selling a new product or service to another company, it is essential to understand who actually makes the decision within the company regarding the product they use for the certain need. This is emphasized by case organization manager Carolina Cray.

> *Is it the nurse or the doctor within a hospital, or the lab manager within a laboratory or some purchase manager [within another kind of company]?*
>
> *- Carolina Cray*

Understanding this is essential for the overall commercialization process of the new product. Therefore, as stated earlier, contacting potential customers early on increases the case product team's awareness and knowledge of these customers and who the key decision makers within them are. In addition, they will now know who you are and what you are planning on offering them. This can make it easier to gain access to the company for prototype testing and demonstrations.

4.2.3 How to help your customers help themselves

Understanding how your customers are able to develop their businesses further is emphasized by manager Nico Nachtmeier of the case organization, as Nico Nachtmeier believes this to be a viable strategy to develop the commercialization of the new offering within the life science industry. In other words, how can you help your customers help themselves? This brings us back to the importance of understanding your customer's business, as this makes it easier to develop the offering to better match the needs of the customer.

> *The head of research department is always fighting for more budget. Which means that they need to have attractive projects, and if you are able to help them to have attractive projects, help them to get more budget, it's something, which they would like to have.*
>
> *- Nico Nachtmeier*

However, sometimes it may even be the case that customers do not fully know what they want from a new product, especially in the case of radical innovations. In such cases it is even more important to be involved with the customer throughout the product development process and to learn more about their business, as otherwise it will be difficult to develop an offering to their needs. This is demonstrated in the following statement by CEO Timo Talvitie of a life science industry company.

> *[Whether the customers know what they want,] I think that really depends. If you have existing technology, I think that the customer knows exactly what they want to get. If it's something completely new that you're coming with, then of course you have to find the right partners to talk to about and then you will find a discussion, which might be the needs for the future.*
>
> *- Timo Talvitie*

According to one member, David Donaldson, of the case product team, it is not enough that we understand the users of the local market, as these are often not the end users that will bring in the big volumes. Understanding the technical aspects that are necessary for the product to work is one aspect and can be seen as similar around the world, but then all the other things involved with how much they will actually order if they are happy with the product are difficult to determine beforehand.

> *What about when we have tested these [aspects], and we go to them, and it turns out that they work. So then, do they order a large amount or do they take it as such that "great, we got this to work" and then they take a small amount of it next to all the other products [that they have]. In the end, there is never any assurance on whether they order a lot of it or just a little bit.*
>
> *- David Donaldson*

As it seems that it is challenging to determine the amount that the larger customers are likely to purchase, the more knowledge the case product team has of the customers' business, approximating the required product amount by the customer will become easier. This can be done through researching for example, how much the customer is currently using similar products in certain metrics or revenue wise, if these are available. Consequently, another method is to form a close collaboration relationship with a customer early on and throughout the development process, which can enable the organization to learn about the customer's needs and their business. This in turn can then help with estimating potential sales amounts.

One manner to develop these close collaboration relationships is by involving the customers in the product development process early on. Customers and end users are one of the most important resources a de alio organization should use in new business commercialization, as they will determine whether the new product is of value or not.

4.2.4 Customer involvement in product development

According to manager Ralf Richter of the case product team, the product team is currently a material supplier and will remain so in the future. Even so, the team works together closely with their customers in order to make sure that the product functions within the customers' applications. This is demonstrated in the following statement by Ralf Richter.

We are a material supplier, but we work together with our customer in order to get our product to function in their technology, such as the robotic devices, and develop it further. We are very involved pretty much until the end to make sure it works [with our customers]. I don't see us going much further in the value chain.

- Ralf Richter

As stated by Ralf Richter, the team is highly involved with the first customers in the value chain, but going a few steps further could increase their understanding of the customers' customer's business as well. This in turn will help them improve their knowledge of their customer's business, which will enable them to better comprehend what the first customer wants from their product. As stated earlier by Mikael Markkunen, new business development is a lot about understanding the business of the customers' customer and even all the way to the end user as that is where the effects of the product will flow down to.

Even so, working together with the customers allows the team to not only make sure that the product works in the applications required by the customer, but also enables the product team to develop the product itself further. This is demonstrated in the following statement by Lauri Länkinen of the product team.

One Finnish company that tested [the product], [said that] the product reacted [in a certain way] and that it did not work. Hearing this we began to do research where we mixed some [chemicals] into [the product] in order to see if it would remain better intact. So we've done these kind of small improvements.

- Lauri Länkinen

Referring back to Ismo Ilmarinen, this is a case of missing the valuable historical data, which is often necessary to convince the customer that you know what you are doing. This is why it is essential to do immense amounts of testing with the product in various environments with different people, and even customers, that have yet to try the product, as it minimizes the potential for customers to run into such issues to which you do not have a solution to.

One of the case organization managers, Carolina Cray, states that when co-creating products together with customers, the optimal situation still is when the customer pays the company, as this is a so-called "tipping point" where the game changes. This gives a completely different meaning to the feedback from the customer as well, since at this point the customer has an incentive to give relevant input to the company developing the product, as they will gain from

that in return. Being closer to the customer and forming a close relationship with them also makes it easier to work through 'bumps' that are often inevitable during the development and commercialization process.

> *The best co-operation is naturally when the [customers] pay us. Since at that point it electrifies the relationship. Everything else until then is just flirting. And then it gives the feedback a completely new meaning as well. At least the cases I've managed, we've always screwed them up a few times, because you need iteration rounds when you're learning things. But the closer you are to the customer all the time and the better the communication relationship is, the better you're able to withstand the bumps along the way.*
>
> *- Carolina Cray*

The development work of new products with customers may be done on either their premises or that of the case organization according to manager Carolina Cray. It depends on the kind of work that is being done and whether the case organization has the necessary resources in place already or not. If the product needs to be applied through certain processes on the customer's side, then it is always necessary to do the development and testing on their site. However, where these resources are located is one aspect, but the relationships that are made between the organization and the customer company come to play a very important role especially in the long run, but also in the short run.

> *All business is between people, if you don't know them, you're out. That's how it is. It all starts from the fact that you're willing to take the effort to get to know the people personally.*
>
> *- Carolina Cray*

Another manager, Frank Fredriksson, within the case organization emphasizes the importance of taking the customer on board the development phase early on, especially when new material is involved, so that they are able to steer the progress in the right direction. Customers can also be a valuable source for finding the correct applications for the product. It is common for the case organization to develop the new offering with regards to the wants and needs that often arise during the co-development and testing process with the customer.

Learning about the customer's business and forming the understanding for the value offering can be emphasized with the use of the lean startup approach throughout the commercialization process. Gaining proof of concept through a minimum viable product

allows for the case product team to deepen their understanding of the customer's requirements. This is turn can help with developing a long-term collaboration relationship with the customer, to further both the case organizations business as well as that of the customer.

4.3 Lean startup in the commercialization process

The lean startup approach is a mentality of developing an offering further through experimentation, proof of concept and close collaboration with the customers. Experimenting is often done using a minimum viable product, whether this is an actual prototype or a mere idea, which establishes the proof of concept. Presenting an offering early on to potential customers creates valuable feedback, which is necessary for improving the product or even the overall development and commercialization process. However, this should be considered an iterative feedback process done on a continuous basis. This in turn can result in realizing the possibility to develop complementary offerings to meet the customer's current or changing needs.

4.3.1 Proof of concept through a minimum viable product

According to manager Ralf Richter of the case organization, the most important aspect when a de alio company is developing something to a new market is to understand the viability and market potential of the product within the new field. Traditional market research can provide the organization with an initial idea, but this then leads to validating the functionality of the product with actual customers within the market – a proof of concept needs to be made. This will enable the company to understand whether the product has potential to provide customers with added value and consequently, begin forming a team around the product, which in any case should be done rather sooner than later, as explained by a member of the case product team.

> *It is at the stage when we have a clear proof of concept [when we should begin forming a team], so we have proven that it works technically, we're able to produce it profitably with certain devices in a particular place and that we've also tested it. And our customers have tested it.*
>
> *- Ralf Richter*

Experimenting is essential when developing something new and this should be done as quickly as possible according to new business developer Anneli Anttonen. In addition, when developing something new, one should remember that the product or service will likely not function as expected and adjustments will need to be made. This is the whole purpose of experimenting – the earlier and more you experiment, the faster and cheaper you will get closer towards an offering ready for full commercialization. Experimenting in new areas can be challenging for mature de alio organizations that have been operating in another field for many decades with little ongoing innovation. As stated by Anneli Anttonen, the case organization has been developing their offerings often very incrementally and to Anttonen's understanding, even customers have sometimes asked them about when they will come up with something new. It seems that the company has not wanted to take any major chances, but if they truly want to renew their strategy and develop new business areas, they will need to take a chance, which requires a change in their overall mentality.

> *Experiment quickly and be prepared that something may go wrong when developing something new. This has actually not been very accepted within the [industry where the case organization is operating in]. Looking back, the development of products has been very incremental. Small steps, small changes. Sometimes customers have asked "So, haven't you invented anything new?". They haven't wanted to take a chance. But, in my opinion, experimenting in the [life science industry] would be a great way to get things moving.*
>
> *You have to start the experimenting somewhere. The faster and sooner the experimenting is done, the faster you will reach the finish line compared to others.*
>
> - *Anneli Anttonen*

Giving away free samples of the product has been done by the case product team, but they noticed that if they give it away for free, the users may never end up trying the product. Therefore, they noticed that it is sometimes better to sell it to the customers according to one member, Petri Penttinen, of the case product team. This is an important psychological aspect to note, especially in the early stages of the product development and commercialization, as customers may think a product is not worth their time if they receive it for free.

As the product can be rather difficult to use, especially on the first try, the product team has wanted to develop the proof of concept with users that are not part of the initial developers. This way they can be sure that the product is viable for the industry. In addition, as there is biology involved in the process of using the product, the repeatability of the current products

on the market is extremely small, as certain things can happen for reasons that nobody knows according to Petri Penttinen of the case product team. This could lead to a competitive advantage, at least in the short term, if the product team were to be able to improve the repeatability of their product in relation to the others. Therefore, more testing and experimenting with various material is necessary to improve the knowledge and data of the product.

Multinational organizations – such as the case company – that are capital intensive and where the initial investments into factories and production lines are often immense can have difficulties when they do not have the necessary equipment for experimenting with a new product. According to case organization manager Carolina Cray, this requires teaming up with customers or other companies, that are able to develop a minimum viable product for as little money as possible, in order to show the management team that there is potential.

> *If you go upstairs and say that you need 20 million, "How about it?" And then they say "Yeah sure, but show me there's business potential." So then, how do you do it if you don't have the machines or equipment? At some time, you just have to convince someone that now this is good. And the cheaper you're able to try [the better].*
>
> *So in the beginning you're sometimes paying a third party, so that they help you, whether it's a university or a small company, so I think this kind of an approach is very smart.*
>
> *- Carolina Cray*

Consequently, it does not matter how the experimentation of a product gets done, but it should always include the customers when a minimum viable product is ready. Analyzing the reactions of the customers can provide the company with insightful data regarding the necessary adjustments that need to be made to the product. Being able to create a minimum viable product for as cheap as possible is further demonstrated in the following statement by professor Gary Grass.

> *In essence you need to first be able to do it as a basic version for as cheap as possible and show that "Hey people are coming here". So that they start using it. The first versions of Dropbox were likely quite horrible. Or the first version of Evernote was likely quite horrible. Facebook was extremely horrible in the beginning.*
>
> *- Gary Grass*

Even though these examples are IT related, they still demonstrate how essential it is to develop a minimum viable product and thus, obtain a proof of concept for as little money as possible.

According to senior manager Olivia O'Sullivan of a life science service provider, when a new material or product is introduced to this market segment, one way to gain market share from the others is by developing certain applications in which this material or product is the only viable option to be used in accordance with. As the development of such an application is likely to require a lot of research, the competition will not be able to mimic the method directly, which will give the organization a competitive advantage for at least a few years. Naturally the method will have to work well compared to the existing applications, but if it does, big pharma companies and CRO's may be more interested in collaborating or even forming long-term customer relationships with the organization.

4.3.2 Product and commercialization development as an iterative feedback process

During the development phase it is common practice that product development and process development is done side by side with contacting customers. This allows for the team to gain feedback from the customers in order to improve their overall operations. Consequently, receiving feedback from the customers is not only relevant in the sense of product development, but should be taken into account in the wider commercialization context altogether.

> *We got ourselves a pretty common approach, in which we do product development and process development at the same time as well as marketing. It's not ordinary marketing, but rather that we contact customers and go to discuss with them, about their needs, and how this could solve their problem. We're able to receive input to the product development.*
>
> *- Ralf Richter*

Product development within the life science field requires commitment and essentially being on the premises of the customer, as this allows for continuous understanding of the processes that are involved with the offering you are attempting to sell to the customer. This in turn then allows for the team to develop the product further, along with the operations and processes involved, as stated by one case organization manager.

It is actually not that simple that we just deliver the material and then wait for a phone call, but rather it requires our involvement there, so that we're able to tell them about how the material behaves. It is this kind of cutting-edge research and technology anyway, so that you have to be involved in it all the time. We cannot just throw [the product] to customers for testing.

- Ralf Richter

According to manager Frank Fredriksson of the case company, the organization is creating these new business areas in a rather new manner, by developing the production, applications and the customer base side by side.

We don't wait that we have a ready-made production process and then think about applications and look at the customers, but instead [look at them at the same time]. Of course [we] need to have some idea of production and obtain samples out, but it very much goes through the studies, but also through customer experiments that the application works.

- Frank Fredriksson

As stated by Frank Fredriksson, the most value for the whole new business development process comes from the customer, as their initial reaction and feedback will force the case product team to modify their offering to better meet the needs of the customer. Even though having some idea on how the production will be done and which applications the product will be used, when the initial contact with the customers is made, the attributes used in the production process and which applications are more suitable are very likely to change. Therefore, it is better and more efficient to begin the experimenting with customers as early as possible before deciding on the production process and applications.

Even though developing the aforementioned is important, understanding your own product or service can be even more vital, as this enables you to determine how it differs from those already on the market and what value you can bring to the customers. If you are not familiar with your product, its characteristics and its features, how are you able to convince the customers that this is better than the competition? This is emphasized by Anneli Anttonen, who has an extensive background in new business development.

You must be very familiar with the product, what you are developing or even creating. Or if you are at the idea stage, what does the product offer. So what are the product features, and perhaps if you can, some reference products to determine how it is in

favor or different from these others, how does it add value. It is often this kind of matchmaking with the end-use market and the product, there's probably a lot of trial and error involved as well.

- Anneli Anttonen

As stated by Anttonen, learning to understand your product requires a lot of research on your own product, but also on that of the competition. In addition, it can also require trial and error to determine what makes it unique and better compared to the others. The importance of knowing your own product is further emphasized by the following example by case organization manager Ismo Ilmarinen.

If you take an example where some Austrian guy that you've never seen, from a company that you've never heard of, comes to sell you some material, and at the same time tells you "I've been here [*in this business*] *for just a year, so I don't really know all these things. I'm actually still learning myself, but this is a really good thing for you. You should take this." In any case, the customer already has some kind of a fear and caution towards the new material, so you should be even more credible and more persuasive than the one who's selling the existing material. Because you should mitigate all of the uncertainty involved, so you should have such a credible expertise and be able to answer all of the questions that concern him or her.*

- Ismo Ilmarinen

As stated by manager Ismo Ilmarinen, when selling a new product to a customer who is already using a competing product that functions properly, being able to convince them to switch to your product requires extensive knowledge of the product. Otherwise, the customer will likely deem there to be too much risk involved with little upside.

Ismo Ilmarinen also mentions that one of the main problems with developing something completely new into a market that you are unfamiliar with is that you do not have any historical data on dealing with the product. In other words, if someone has a problem, which you have not run into, you will not be able to advise them on the matter, which in turn has a negative impact on your credibility. Therefore, immense amount of product testing in various settings is required in order to build this data. Furthermore, it is better to have people or customers who have never used the product before to use it, as they may run into issues that you have not come across – using a product for the very first time is completely different from having being in the development process from the beginning on.

Honesty is an aspect that is extremely important when you are creating something new according to case organization manager Carolina Cray. Especially when talking to your first customer – even when they may know you as a large player in another field – telling them that "you are my first customer" is important, as it makes them understand that the product is still under development and therefore, they will not expect it to be a finalized product.

> *Well, I've always began so that I've started to sell directly. There's one important matter, you have to remember to be damn honest with your first customer and tell him or her that you are my first customer, because otherwise, [the case organization] raises expectations that everything works, as it has for the past one hundred years, [and the] customers expect [the new product] to be ready.*
>
> *- Carolina Cray*

According to Carolina Cray, by attempting to sell the offering as soon as possible enables you to understand whether the market will actually like the product. This should be done rather sooner than later and even before a prototype is ready, if that is somehow possible. The reason behind this is that no matter what potential customers may say about the initial idea or product, if they are not willing to pay for it, they are not interested enough.

> *I go straight away or rather a little before the [the product] is ready, so then you get the customer feedback immediately. And if the customer gives you money, you can be sure that it interests them. Everything else is just warm air if they say that they say that "yeah we're interested", but are not willing to pay. This is when alarm bells should ring.*
>
> *- Carolina Cray*

Carolina Cray continues that once you are able to actually sell the product, everything changes and you are on the right path towards building a business.

> *But as soon as you receive money, it is a clear indication that that it works. And it will raise your organization's heart rate level, because the name of the game changes from product development, the second the first invoice is sent. I think it's a kind of a culmination point, which one should reach as quickly as possible.*
>
> *- Carolina Cray*

According to a founder, Jaana Jarmonen, of one company within the life science industry, the market will grow, but the methods that are able to come to the market and compete with the

rest need to have the biological aspects in check. However, in addition, the product should not be too difficult to use nor be too expensive.

> *At the end of the day it needs to be a method which meets the biological needs of being [as] accurate as possible, not too difficult to use and not too expensive. Otherwise people just won't bother. The second condition is that, even if you come up with a spectacularly good model, if it's incredibly complicated, very sensitive, variable and all over the place, and it's just very difficult to live with, why use it? More and more models will appear, which meet the biological end, the logistical and price as well.*
>
> *- Jaana Jarmonen*

Therefore, the main considerations with a product targeted at the specific sector within the life science industry are for it to meet the biological aspects and be easy to use. Price is another aspect, but without meeting the first two criteria, the price becomes irrelevant. In addition, being in the ball park with the price of competing products with a functioning and easy to use product is deemed to be acceptable. However, when the competition of such products increases, factors such as price and ease of storage will become the next factors for companies to consider. Consequently, when certain factors that companies compare their products with become standards and thus, will be considered as a given, other factors will become the ones used for comparison.

Overall, however, the cost should not be the main consideration when talking about the life science industry and the specific application that this case product is targeted at, since biology is involved. It is more about the features and unique properties of the product as stated in the following quotation by a manager of the case organization.

> *[With the case product] you sell more the properties [that are] unique in [the] field. Of course always the cost is (somehow interesting), but if it's 10% or 20% higher or lower in production costs, then nobody cares. It's really about the unique properties. You always need to know, (a lot of your) product and the application of the customers.*
>
> *- Nico Nachtmeier*

Developing one successful product for an unfamiliar market by a de alio multinational is already a step in the right direction. However, with such a competitive and evolving market as that of the life science industry, developing additional and complementary products should be seen as a continuous process.

4.3.3 Developing complementary offerings

By being able to fully understand the customer's business, the case product team will be better able to develop additional or complementary products for the customer. Case organization manager, Nico Nachtmeier, emphasizes the importance of understanding the whole customer system that is involved with selling a product to them. Selling one product is like "getting your foot in the door", but the real selling of further products occurs afterwards through a long-term customer relationship. Even though within this specific sector within the life science industry, companies are dealing with companies, personal relationships come to play a crucial role in the long-term.

> *You need to surprise them from time to time, it's not only one-time innovation. They will wait for new products or upgrades next year. And if you do your job well, these customers will invite you from time to time to present your new innovations. This is a long journey, so production process is not important for the [case product] business [at the moment]. It's really the knowledge of your customer system, and the knowledge of your customers.*
>
> *- Nico Nachtmeier*

Consequently, once the initial customer needs have been identified and suitable products or services have been developed, the process should commence again in order to identify new features that the customers may want or need according to a company founder, Eve Elder. As the market develops, the products and services need to develop alongside the market in order to be able compete with the other players. This can also lead to new bigger things, such as platforms or applications that may not have initially been thought of.

When new players attempt to enter into the market with their products, there are several criteria that a customer or existing player will look at according to one manager, Timo Talvitie, of a mature company operating in the field. The technology will be checked first to determine whether it works, customers' customers will be asked whether the product would be useful for them, and comparison to existing products in terms of functionality, features and pricing. New technologies are also often only of interest to academics according to this manager.

> *Every scientist will tell you "my system is the best". I think it's, 80% of all these systems are only of interest for academics. I think, (I've got) a couple of systems on my*

desk, which are of interest in terms of basic research, but if you think about the commercial chance, I told them "no chance".

- Timo Talvitie

Better understanding the customer needs can often lead to the presently more popular solution-based business model, which combines products and services. This way an organization is able to integrate and apply the products to the specific needs of the customer. A solution-based business model involves close collaboration with the customer, which can be beneficial especially in the early stages for learning purposes. Consequently, this can provide valuable insights into the overall products and operations development that are required for the commercialization of the new product. The following statements by case organization manager Mikael Markkunen, demonstrate how the case organization came to use the solution-based business model through customer understanding in another one of their new products.

The key motivation or the key decision to go for a solution-oriented approach comes from, first of all the notion that our customers do not have the technical capabilities and resources to develop the solution themselves. They're lacking, actually resources they're lacking know-how, in order to do it properly. Second, we see it as a perfect tool for differentiation.

I would say that they were screwing up in every dimension one could possibly think of. They were lacking the chemical know-how and chemical understanding. These were the two most important ones I would say. Of course application-wise they're fine, that's their business at the end of the day.

- Mikael Markkunen

As the case organization is a mature company within a highly production-oriented industry, the focus has been on cost and how to make the processes more efficient. However, as the specific sector of the life science industry in question here, along with the other industry referred to by Mikael Markkunen both involve more high-tech innovation and less focus on cost, the case organization needs to rethink their approach when it comes to such new business development initiatives. The same logic is no longer valid nor useful within such new industries.

This has been a cost-driven industry for the last 20 years or at least 10 years, so innovation capabilities, we found quite painfully are missing completely. In other words, they were also missing out on developing a value proposition for the new

product. The only thing they were talking about is cost, that's all they know. But marketing, a partially [new material-based] solution effectively, was not part of their thinking.

- Mikael Markkunen

When a de alio organization enters an unfamiliar market, it is essential for them to be humble with regards to the learning process and adapt accordingly. The lean startup approach uses quick experimentation, proof of concept and close collaboration with customers to create this learning. It should be used as an iterative feedback process done on a continuous basis to improve both the offering as well as the overall commercialization of the product. When done correctly with the first product can develop the necessary capabilities and knowledge base within a team, which in turn can be used in developing and commercializing additional or complementary products to the same market.

4.4 Summary of empirical findings

As presented in the empirical findings, the case organization uses specified criteria for developing new businesses for an unfamiliar market, which focuses on: strategic-, scope-, scale- and timing-fit. When entering a new unfamiliar market, it is often challenging for a traditional industrial organization to adapt, as they have been used to focusing on developing the efficiency of their current operations. Consequently, the case organization needs to have a certain flexibility with regards to learning the new market. The case product can be perceived as a probe for learning about the market – whether about the customers and users or other aspects related to the commercialization process.

It is essential to remember to account for the time factor, as the specific sector within the life science industry is rather turbulent and evolving rapidly with changing customer needs and requirements, along with new applications and companies arising every year. The customers and users generally want the products and materials to function quickly and in correct manner, in order for them to continue with their following work processes. Being able to develop an offering that fulfills these requirements and thus, provides the necessary value, along with commercializing this successfully requires the team to have the right people. The capabilities of individuals within a small team become essential and these people should be entrepreneurially minded, in order to get things done and learn about the market on the go.

When entering a new market, even a large multinational such as the case organization is unknown within the industry, which creates certain challenges for the company. With regards to the life science industry, where companies rely on strong networks, the case organization is at a disadvantage from the beginning. Consequently, it has been crucial that the case product team establishes presence early on during the commercialization process into the unfamiliar market. This has been achieved through various means such as networking at conferences and taking advantage of already existing personal relationships.

When developing an offering to an unfamiliar market, understanding the customer's business becomes vital, especially in such a complex environment as the life science industry. However, first it is necessary to determine who the actual customers are. Once the customer segments have been identified, the learning process about their business begins. By better understanding the requirements of the customer or end user in their processes and overall operations, the easier it is to create an offering and thus, a value proposition, which is of greater interest for them. This brings us to the questions of, how can you help your customers help themselves? What can enable the customers to develop their business further? Who are the customers of our customers and what do they value?

Better understanding of the customer's and end user's needs can be developed through their involvement in the product development process, as this requires the case product team to be involved in the daily processes of the customer. As emphasized by the interviewees, developing this so-called 'historical' data requires immense amounts of testing and experimentation, but is essential in terms of the case product team's credibility. In other words, when a customer requires support with regards to using the material or product, the team has to have the answers to guide the customer. This is especially important with the case product team's offering into the life science industry, as it has been determined to be difficult to handle by users on the first try.

Simply beginning to sell an offering to customers can also help with understanding the overall commercialization process along with the steps involved, in order to make it as effortless as possible for the customer. As a customer often tends to already be using a functional product, the risks along with the switching costs involved from the customer's perspective are aspects that need to be understood by the case product team. This will enable them to learn about

what factors need to be considered in the commercialization process, in order to convince the customer to purchase the product.

The customer or end user is the source that determines the true value of an offering and therefore, getting their feedback as early as possible can make the overall commercialization process of a new offering to an unfamiliar market less painful. The lean startup approach is based on receiving feedback on an idea or initial product to determine its functionality and value in the eyes of the customer. This feedback is then used to modify the offering accordingly to better meet the customer's or end user's needs. The offering is then presented to potential customers once again and this loop is used until a proof of concept can be determined. As stated by experienced new business developer Anneli Anttonen, *"The faster and sooner the experimenting is done, the faster you will reach the finish line compared to others."*

This approach has been used by the case product team to check the biological viability of their product early on, as without meeting the biological requirements, the product would not be considered in the sector for the life science industry. The product also functions well in most applications, but is deemed rather difficult to use, especially on the first try. As stated by Petri Penttinen of the case product team, the market has yet to see a product that improves the repeatability of the research and therefore, this could be seen as an area to focus on. This could include developing an application in which the current product is used to differentiate it from the competition as stated by senior manager Olivia O'Sullivan of a life science service provider.

However, creating the right kind of product is one thing, as the overall commercialization process involves numerous aspects. Consequently, lean startup approach can and should be used as an iterative feedback process in the overall commercialization process to make it as efficient and effective as possible. If this is done correctly with one product, the amount of learning and contacts developed, enables the case product team to have the possibility of creating additional or complementary products to be commercialized using the same approach with much less effort.

5.0 Conclusion

As the empirical findings have been presented, the conclusion will begin by discussing these findings in the light of the earlier research discussed in the literature review. This is followed by an analysis of the case product team's progress according to the 'best practices' of the lean startup approach. This leads into the specific recommendations for the case organization regarding the commercialization of their product into the life science industry. Lastly, limitations regarding this study are discussed along with suggestions for further research.

5.1 Empirical findings discussed in respect to earlier research

As presented in the empirical findings, the product developed by the case organization can be used as a probe for learning about the market in general, regardless of the area of focus. If this learning can be stored as knowledge within the case product team in an efficient and usable manner, it can provide the organization with a competitive advantage as found by Berends et al. (2007) and Lynn, Skov and Abel (1999) and Chen, Damanpour and Reilly (2010). As the case product team is commercializing the new product to an unfamiliar market, it can be considered as a radical innovation for the case organization as well as the team. Therefore, as stated by McIntosh and Taylor (2013) and McLaughlin, Bessant and Smart (2005), by developing more knowledge about the market, along with the various stakeholders involved, the case product team can move closer towards incremental and routine-like management of the new venture. This requires constant involvement in the market by attending various events for learning purposes. This in turn requires the case organization to be open and flexible with regards to adapting to the new market, as stated by several interviewees, since the approaches used in the de alio's core market may not function in the life science industry. Consequently, is the case organization mentally prepared to enter a new and unfamiliar industry? The success of the commercialization of the case product may determine the answer to this question.

The time factor is another fundamental area that needs to be considered, as the specific sector within the life science industry is extremely turbulent and evolving rapidly with new companies and their respective applications entering the market every year. As stated by Hutlink et al. (2000) and Cooper et al. (2004), it is more important to focus on the time element with a new product commercialization process than on the budget. Therefore, as understood through the interviews, the window of opportunity with regards to gaining some

market position within this industry is not open for long and thus, requires rapid experimentation of various commercialization initiatives by the case product team. This includes testing and experimenting different business models around the product, in order to find a model that suits both the case organization as well as the customers. What are the capabilities of the case product team with regards to experimenting with these business models for example? How quickly are they able to pivot the model after realizing the reactions of the customers? In addition, can the de alio case organization hinder the flexibility of the case product team with their likely bureaucratic processes where changes have to be approved by the upper management? These aspects are going to arise when the case product team is able to form a more thorough business model.

Overall, learning about the unfamiliar market is only the beginning, as with developing a new product to this market, it becomes more important to focus on understanding the customers' and end users' needs, as stated by numerous interviewees. This could be thought of as developing a business from inside-out – meaning, understanding the certain challenges and issues that these customers may have within a market, and then learning about the most relevant stakeholders closest to the customer. These stakeholders may in some cases be the cause of some of these challenges and can provide the case product team with valuable knowledge regarding future product or service innovations if the case organization is to continue in the life science industry. In other cases, the challenges are related to the customer's own work processes and operations. As stated by Witell et al. (2011), Furr, Dyer and Christensen (2014), Blank (2013), and Piller and Walcher (2006), in the end, the customer or end user is the only source that is able to determine the true value of an offering. Naturally, it is still fundamental to get an overall understanding of the market structure and the roles of the various stakeholders before diving in for an in-depth understanding of the customers and end users.

Consequently, establishing presence early on in the unfamiliar market is vital, especially when the various stakeholders within the market are not familiar with the case organization. In addition, in the case of the life science industry where everyone is determined with building strong networks, establishing presence early on has been essential for the case product team as well as other recently formed companies. The large pharmaceutical organizations seem to analyze new products through their partner contract research organizations or other partner companies, which emphasizes the importance of forming these

contacts. This can also be related to the learning aspect of the market and how the different stakeholders interact with one another as discussed by Berends et al. (2007), Lynn, Skov and Abel (1999) and Chen, Damanpour and Reilly (2010). Now, which networks would be most suitable for the case organization? The management could consider networks in which the company is able to provide additional value – such as certain aspects related to it being a de alio multinational with immense resources – but where it can gain something in return, such as knowledge and learning about the market.

According to Hoyer et al. (2010), Furr, Dyer and Christensen (2014), and Ulaga and Chacour (2001), customers have become more empowered and demanding, which requires organizations to develop increasing value to meet their requirements. In such a complex environment, such as the life science industry, without full comprehension of the customers' and end users' work processes and daily operations, providing this value is challenging. However, before using resources to learn about the customers and end users, it is important to determine "Who the actual customers are?", as stated by several managers. This is also emphasized by Enkel, Perez-Freije and Gassmann (2005) and Furr, Dyer and Christensen (2014), along with the importance of creating customers, which is vital in the commercialization process.

Is the case product team certain about which customer segments it should target? If the wrong type of customers are chosen, it can slow down the whole commercialization of the new product, as these customers may not be the ones that can provide the case product team with the relevant knowledge. In addition, sometimes it can be more useful to create customers, which in this case can be to convince those researchers using a certain older application within the specific sector of the life science sector to switch to the new more innovative application. This way the case product team would not have to compete for the customers that are already using the more innovative application. As stated by one of the case organization managers, convincing someone to switch a functioning product in their application is extremely challenging to do.

Having determined the relevant customer segments, the learning process begins, which often involves co-creation activities with these customers in order to understand their work processes and daily operations. As specified by Alam and Perry (2002), Callahan and Lasry (2004), and Gustafsson et al. (2012) customer and user co-creation can enable a team to learn

about their respective requirements in order to develop or improve an offering to provide a 'closer fit' with their respective needs. Such co-creation initiatives have been done by the case product team and have provided the team with valuable knowledge about the product's functionality in the users' processes and in various applications used by the customers. As presented in the literature review, the customer co-creation process can also provide an organization with a vast amount of other benefits, such as decreasing the possibility for a product failure, entering a market more rapidly, and exploring further applications for a product (Hoyer et al., 2010; Cook, 2008; Ogawa and Piller, 2006; Fang, 2008; Joshi and Sharma, 2004; Sawhney et al., 2005; Grewal et al., 2006; Muniz and Schau, 2005; Xie et al., 2008). The case product team may have learned a lot about the customer's business through their co-creation activities, even if it may not be something specific that is easily defined.

Several of the interviewees emphasize the importance of creating 'historical' data, as it can improve the case product team's credibility through better product support. More importantly, it creates crucial learning about the products functionality and features, which are essential parts of a new business commercialization process as stated by Berends et al. (2007) and Lynn, Skov and Abel (1999) and Chen, Damanpour and Reilly (2010). This naturally requires immense amounts of testing and experimentation, especially with first time users, as they have considered the product to be challenging to use. Turning around these bad first impressions will be even more challenging than convincing them to try the product in the first place. Therefore, it is essential that the case product team focus on minimizing the possibility for such challenges to arise in their customers' processes. How can this be done – is something that needs to be determined by the team. Overall, creating historical data will become increasingly important if the product gains traction in the market.

According to a few of the interviewees, simply beginning to sell the product can help with learning about these processes and needs of the customer and the end user. Customers often already tend to have existing products or materials in use, which emphasizes the importance of understanding the switching costs and risks from the customer's perspective, if they are to use the case product instead. This is a vital aspect in the overall customer understanding process as found by Berends et al. (2007) and Lynn, Skov and Abel (1999) and Chen, Damanpour and Reilly (2010), as it can form the basis for the commercialization process of how the customer's uncertainty regarding the product is removed and thus, convincing them to purchase the product.

As stated by one of the case organization managers, Ismo Ilmarinen, successful commercialization is often dependent on the individuals of the team, which naturally becomes more important with smaller teams, as each team member is responsible for a larger stake of the whole operation. Consequently, entrepreneurial-minded people that have the ambition to learn and the capabilities to get things done are needed, as stated by the manager, especially in these new ventures where a lot of unknowns exist. This goes well in-line with Baron (2006), Furr, Dyer and Christensen (2014), Bonabeau et al. (2008), Lynn, Skov and Abel (1999) and Chen, Damanpour and Reilly (2010), who emphasize the use of entrepreneurial thinking with the overall learning process of the unfamiliar market. However, what about the members of the case product team? Are they entrepreneurially-minded enough? This will likely be determined in the near stages of the commercialization process of the product.

When developing a new offering to an unfamiliar market, several of the interviewees state that it is more important to measure the so-called 'next steps' of the overall development and commercialization process of the offering than relying on the traditional financial metrics. In other words, if it is challenging to develop a prototype, then that should be used as a metric, or if it is challenging to find customer, then that should be used as a metric and so on. This is similar to what is emphasized in the literature by O'Connor and Rice (2013), Müller and Thoring (2012), and Blank (2013), who find that focus should be put on aspects related to the value and overall potential of the offering within the market. With regards to the case product team, what should they measure? They have developed a product, which has been used to create a proof of concept, but is it complete enough that it provides customers with the necessary value for them to move onto using a different criterion? In addition, the case product team already has some customers, but it seems that these are still rather challenging to attract. Could this be another criterion for them to use?

Several of the interviewees emphasize the use of experimentation and testing with actual customers in order to determine the true value of the offering. This has been done well by the case product team with regards to validating the biological requirements, along with developing and modifying the features and functionality of the product. However, as stated by Müller and Thoring (2012), Blank (2013), Furr, Dyer and Christensen (2014), and Witell et al. (2011), it should be used in the overall commercialization process in order to validate the business assumptions that the case organization may have regarding their product. This

includes crucial aspects such as the business model, which will need experimentation in order to determine the model that best suits the market and the capabilities of the team and the organization as a whole. Furthermore, experimentation should be used as a continuous iterative feedback process with regards to product development as well as commercialization development. Is the case product team determined and willing to continue with the experimentation even if they seem to have reached an objective at some stage? This is an important aspect to consider, especially in such a turbulent and uncertain environment as the life science industry.

Overall, the lean startup approach provides an organization with a rapid learning mechanism (Berends et al., 2007; Chen, Damanpour and Reilly, 2010; and Lynn, Skov and Abel, 1999) to develop its understanding of the structure of the market, along with the operations of the various stakeholders involved. More importantly, as emphasized by several interviewees, it can help an organization – and in this context the case product team – in finding the most successful product commercialization model into the unfamiliar market (Khanna et al., 2015). According to many of the interviewees and found in the literature by Müller and Thoring (2012), Blank (2013), Furr, Dyer and Christensen (2014), and Witell et al. (2011), the lean startup approach should be used as a continuous process in order to keep up with the changing needs of the customers as the market evolves.

5.2 Recommendations for the case organization

Overall the case product team has been operating fairly well according to the 'best practices' of the lean startup approach in a new product commercialization process. A proof of concept has been developed together with scientists and researchers in order to validate the functionality of the product, both biologically and in various applications. This has also increased the number of research publications, which will need to be an ongoing process and should involve the key opinion leaders within the market to improve the quality of the reference base. The product team has been getting involved in the market as soon as possible by attending various conferences and contacting potential customers and even suppliers. This is an important aspect with regards to establishing presence in the unfamiliar market, where nobody is familiar with the organization and the organization has yet to prove its viability to even be involved in the market.

The learning curve is always a matter that needs to be addressed and the case product team has been developing its knowhow of the market not only through traditional market research, but also through early commercialization and customer involvement in the product development. This allows the team to hear and learn about the changing customer and user requirements as the market evolves, and what the customers actually care about with regards to the product. Lastly, experimenting in various settings to create 'historical' data has also been done, which is a natural process in product development, but becomes ever more important if and when the product gains traction and customers begin demanding product support with regards to its functionality.

However, even though the early signs of the new business commercialization process deem it to be on the right track from the lean startup approach and learning perspective, there are numerous areas that the case product team should consider in these crucial stages of the product commercialization. Certain recommendations for the case product team are presented next.

1. Understanding the customer's business in depth

As discussed in the empirical findings and in the presented literature, understanding the customer's business is an essential part that needs to be developed within the case product team. This means forming close collaboration relationships with the customers and users to get a deeper understanding of their daily operations and the processes that need to be taken into account with the applications where the product is intended to be used. By understanding the daily operations of the customer, along with the end users of the product, it will be easier for the team to determine what features and characteristics of the product truly matter, and which are less important for them with respect to each application. This can also help with developing the product to a certain extent where it is able to be applied to most applications and whether customization should be done at all. The bottom line here is – how can you help your customers help themselves? What can enable the customers to develop their business further? Who are the customers of our customers and what do they value?

2. Forming a clear value proposition

By better understanding the customer's business also allows for the formulation of a clear value proposition, which still seems to be missing. The product has certain features and characteristics that make it worth using in life science research, but what are the key

differentiation factors with regards to the competition that make it the optimal choice? This still needs to be established. Even if it can be formulated with regards to just one specific application within the life science industry, it can create a notion of success, which can help drive the modifications to other applications.

3. Determining key purchase decision makers within customer companies

Once the customers have been identified, it is important to determine the 'customers within the customer' so to say. Who are the key purchase decision makers within these companies with regards to which product to use in their operations? On what grounds do they base their decisions on? Sometimes it may be more useful to know the right people than have the best product, which emphasizes the importance of networking within the market. These decision makers may make their choices based on the people they know and like, which further demonstrates the notion that 'all business is between people'. Another essential aspect to consider here is whether these decision makers are scientists or business people, as the two will likely focus on differing areas with regards to the product features.

4. Eliminating the issues that arise when using the product for the first time

As has come to our attention, when the users of the product try it for the first time, they are having certain challenges with getting to function correctly, in order to move on to the next steps. First impressions are vital in any industry, but especially in one where time is at stake and researchers or scientists simply want to the product to function effortlessly and on the first try. In addition, it will require even more work and persuasion the second time around to convince these customers to try the product again if they were not satisfied the first time. Something to think about here is, whether there would be some possibilities to develop complementary products or methods to accompany the process in order to remove these challenges. This brings us back to the importance of developing 'historical data', which should also be seen as a continuous process and used with more applications for which the product is suitable. This will enable product support, which will become essential if and when the product gains traction in the market.

5. Attracting researchers or scientists that are in the early stages of their career

Researchers or scientists that are in the early stages of their career can provide the case organization with immense lifetime value. Consequently, providing them with some kind of an incentive to use the product in one of their studies could function as a stepping stone to

getting them on board as long term customers and maybe even as co-developers. What this incentive could be can best be determined by understanding what they actually care about. This brings us back to customer and end user understanding. Determining whether they care about the same matters as established researchers and how the processes have changed in the past five, 10 or 20 years are factors that should be considered here.

6. Starting to think about the product within the larger context of the case organization's potential entrance into the life science industry

A significant investment has been made into the product commercialization within the past years, which has created valuable learning and knowledge within the case product team about the initially unfamiliar market. Even if this product were to not be the groundbreaker within this market for the case organization, the developed understanding of the market can be used to innovate other offerings, which can utilize this knowledge and be more in-line with the existing operations of the case organization. As the case organization possesses extensive production capabilities and thus, in depth knowledge of process development, a potential area within the life science industry could be to develop a solution to improve the overall speed of the entire research process of scientists and researchers. This could even consist of the already developed product along with a complementary application in which the product is used to address this issue that the scientists and researchers face. Overall, this could be an area that utilizes both the developed understanding of the market and processes within the life science industry, along with the existing capabilities of the case organization. If the product were to become a success, developing a wider product portfolio is necessary, as the competition have numerous products and applications methods that they offer.

5.3 Limitations of the study

One of the main limitations of this study is that the research group in charge of the commercialization project for the case organization was not granted permission to interview actual customers. As the data for this Master's Thesis was taken from these same interviews, it did not provide the perspective of actual customers within the life science industry. As the focus of this study has been about developing customer understanding during the commercialization process of a new offering to an unfamiliar market, it would have been crucial to interview actual customers to learn about how this understanding can be developed

by being involved in their work processes and learning about the customer's business. By being allowed to interview existing customers or potential customers could have given this research study more relevant data with regards to answering the main research question of "*How to develop customer understanding during the commercialization process of a new offering to an unfamiliar market?"* Researching how to develop this from the customer's perspective can be considered an area for further research.

As the interviews for the research project were completed by five individuals, the researcher was not present at all of the interviews. Therefore, the topics discussed in some interviews were more focused on the other two Master's Theses or the commercialization project in general. Consequently, the interviewees potential to provide their knowledge regarding the topic of this Master's Thesis was likely not reached. By being able to attend all of the interviews and discuss the topics relevant to this study could have further strengthened the empirical findings section and therefore, the overall results of the study.

5.4 Suggestions for further research

As stated in the limitations of the study, completing a study about the work processes of researchers and scientists, in order to develop a better understanding of their daily operations is an area for further research. This study has focused on the perspective of various individuals within the case organization and the respective case product team, researchers, suppliers, startups, network founders, product and service providers, as well as professors. Consequently, no field research within the actual work processes of the researchers or scientists has been done, which could provide organizations with an in depth understanding of what needs to be considered in their daily operations when developing an offering to address their needs. A suggestion for a research question in this area is:

- *How should the work processes of researchers and scientists in the life science industry be studied in order to help with developing value-adding offerings to the market?*

Another suggestion for further research is to determine the purchase-decision makers within universities, contract research organizations – also known as CRO's – and pharmaceutical

organizations and on what grounds these individuals or teams make their decisions on which product to use in their research studies or in their respective processes and applications. As stated by one of the case organization managers, Carolina Cray, *"Is it the nurse or the doctor within a hospital, or the lab manager within a laboratory or some purchase manager [within another kind of company]?"* Consequently, this could provide organizations with valuable information with regards to which features or areas they should focus on in their offerings and what aspects are not as important. A suggestion for research questions in this area is:

- *Who are the purchase-decision makers within universities, contract research organizations and pharmaceutical organizations?*
- *On what grounds do they base their decisions with regards to which products are used in their research or in their respective applications?*

References

Abdulmalek, F. A., & Rajgopal, J. (2007). Analyzing the benefits of lean manufacturing and value stream mapping via simulation: A process sector case study. *International Journal of production economics*, *107*(1), 223-236.

Alam, I., & Perry, C. (2002). A customer-oriented new service development process. *Journal of services Marketing*, *16*(6), 515-534.

Aronson, J. (1995). A pragmatic view of thematic analysis. *The qualitative report*, *2*(1), 1-3.

Baron, R. A. (2006). Opportunity recognition as pattern recognition: How entrepreneurs "connect the dots" to identify new business opportunities. *The Academy of Management Perspectives*, *20*(1), 104-119.

Berends, H., Vanhaverbeke, W., & Kirschbaum, R. (2007). Knowledge management challenges in new business development: Case study observations. *Journal of Engineering and Technology Management*, *24*(4), 314-328.

Blank, S. (2013). Why the lean start-up changes everything. *Harvard Business Review*, *91*(5), 63-72.

Business Dictionary. (2016). *Business Dictionary*. Retrieved 27 February, 2016, from http://www.businessdictionary.com.

Bonabeau, E., Bodick, N., & Armstrong, R. W. (2008). A more rational approach to new-product development. *Harvard business review*, *86*(3), 96.

Bowers, M. R., Charles, L. M., and Alan, L. (1990), Trading places: Employees as Customers, Customers as Employees. *Journal of Services Marketing, 4* (2), 55-69.

Bowman, C., & Ambrosini, V. 2000. Value creation versus value capture: Towards a coherent definition of value in strategy. British Journal of Management, 11: 1–15.

Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative research in psychology*, *3*(2), 77-101.

Callahan, J., & Lasry, E. (2004). The importance of customer input in the development of very new products. *R&D Management*, *34*(2), 107-120.

Chen, J., Damanpour, F., & Reilly, R. R. (2010). Understanding antecedents of new product development speed: A meta-analysis. *Journal of Operations Management*, *28*(1), 17-33.

Cook, S. (2008), ''The Contribution Revolution,'' *Harvard Business Review, 86* (October), 60-69.

Cooper, R. G. and Edgett, S. J. (2003). "Overcoming the crunch in resources for new product development." *Research Technology Management, May/Jun, 46*(3), 48-59.

Cooper, R. G., Edgett, S. J. and Kleinschmidt, E. J. (2004). "Benchmarking Best NPD Practices – II." *Research Technology Management, May/Jun, 47*(3), 50- 61.

Dickson, E. W., Singh, S., Cheung, D. S., Wyatt, C. C., & Nugent, A. S. (2009). Application of lean manufacturing techniques in the emergency department. *The Journal of emergency medicine*, *37*(2), 177-182.

Enkel, E., Perez-Freije, J., & Gassmann, O. (2005). Minimizing market risks through customer integration in new product development: learning from bad practice. *Creativity and Innovation Management*, *14*(4), 425-437.

Eriksson, P. & Kovalainen, A. (2008) Qualitative Methods in Business Research. London: Sage.

Fang, Eric (2008), ''Customer Participation and the Trade-Off between New Product Innovativeness and Speed to Market,'' *Journal of Marketing, 72* (4), 90-104.

Franke, Nikolaus, Eric von Hippel, and Martin Schreier (2006), ''Finding Commercially Attractive User Innovations: A Test of Lead-User Theory,'' *Journal of Product Innovation Management, 23* (4), 301-315.

Friedman, T. L. (2006). *The world is flat [updated and expanded]: A brief history of the twenty-first century*. Macmillan.

Furr, N., Dyer, J., & Christensen, C. M. (2014). *The Innovator's Method: Bringing the Lean Startup Into Your Organization*. Harvard Business Press.

Gawer, A., & Cusumano, M. A. (2014). Industry platforms and ecosystem innovation. *Journal of Product Innovation Management*, *31*(3), 417-433.

Gerwin, D. and Ferris, S. J. (2004). "Organising New Product Development Projects in Strategic Alliances." *Organisation Science, Jan/Feb, 15*(1), 22-38.

Grewal, Rajdeep, Gary Lilien, and Girish Mallapragada (2006), ''Location, Location, Location: How Network Embeddedness Affects Project Success in Open source Systems,'' *Management Science, 52 (7),* 1043-1056.

Gustafsson, A., Kristensson, P., & Witell, L. (2012). Customer co-creation in service innovation: a matter of communication? *Journal of Service Management*, *23*(3), 311-327.

Hoyer, W. D., Chandy, R., Dorotic, M., Krafft, M., & Singh, S. S. (2010). Consumer cocreation in new product development. *Journal of Service Research*, *13*(3), 283-296.

Hutlink, E. J., Hart, S. J., Robben, H. S. J. and Griffin, A. (2000). "Launch decisions and new product success: an empirical comparison of consumer and industrial products." *Journal of Product Innovation Management, 17*(1), 5-23.

Joshi, Ashwin W. and Sanjay Sharma (2004), ‘‘Customer Knowledge Development: Antecedents and Impact on New Product Performance,’’ *Journal of Marketing, 68* (3), 47-59.

Keinz, P. and Steger, C. J. (2009), ‘‘Testing the Value of Customization: When Do Customers Really Prefer Prod- ucts Tailored to Their Preferences?’’ *Journal of Marketing, 73* (5), 103-121.

Khanna, R., Guler, I., & Nerkar, A. (2015). Fail Often, Fail Big, and Fail Fast? Learning from Small Failures and R&D Performance in the Pharmaceutical Industry. *Academy of Management Journal*, amj-2013.

Kim, W. C., & Mauborgne, R. (2014). *Blue Ocean Strategy, Expanded Edition: How to Create Uncontested Market Space and Make the Competition Irrelevant*. Harvard Business Review Press.

Kim, W. C., & Mauborgne, R. (1999). Creating new market space. *Harvard Business Review*, *77*(1), 83-93.

Ko, A. J., Abraham, R., Beckwith, L., Blackwell, A., Burnett, M., Erwig, M., ... & Rosson, M. B. (2011). The state of the art in end user software engineering. *ACM Computing Surveys (CSUR)*, *43*(3), 21.

Lepak, D. P., Smith, K. G., & Taylor, M. S. (2007). Value creation and value capture: a multilevel perspective. *Academy of management review*, *32*(1), 180-194.

Lilien, Gary L., Pamela D. Morrison, Kathleen Searls, Mary Sonnack, and Eric von Hippel (2002), ‘‘Performance Assessment of the Lead User Idea-Generation Process for New Product,’’ *Management Science, 48* (8), 1042-1059.

Lincoln, Y. S., & Guba, E. G. (1985). *Naturalistic inquiry* (Vol. 75). Sage.

Lovelock, Christopher H. and Robert F. Young (1979), ‘‘Look to Consumers to Increase Productivity,*’’ Harvard Business Review, 57* (May-June), 168-178.

Lynn, G. S., Skov, R. B., & Abel, K. D. (1999). Practices that support team learning and their impact on speed to market and new product success.*Journal of Product Innovation Management*, *16*(5), 439-454.

Magnusson, Peter R., Jonas Matthing, and Per Kristensson (2003), ‘‘Managing User Involvement in Service Innovation: Experiments With Innovating End Users,’’ *Journal of Service Research, 6* (2), 111-124.

Mathwick, Charla, Wiertz, C. and De Ruyter, K. (2007), ‘‘Social Capital Production in a Virtual P3 Community,’’ *Journal of Consumer Research, 34* (April), 832-849.

McIntosh, B. S., & Taylor, A. (2013). Developing T-Shaped Water Professionals: Building Capacity in Collaboration, Learning, and Leadership to Drive Innovation. *Journal of Contemporary Water Research & Education*,*150*(1), 6-17.

McLaughlin, P., Bessant, J., & Smart, P. (2005). Developing an organizational culture that facilitates radical innovation in a mature small to medium sized company: emergent findings.

Moogk, D. R. (2012). Minimum viable product and the importance of experimentation in technology startups. *Technology Innovation Management Review*, *2*(3), 23.

Moore, J. F. (2006). Business ecosystems and the view from the firm. *Antitrust Bull.*, *51*, 31.

Moore, J.F. (1996). The Death of Competition: Leadership & Strategy in the Age of Business Ecosystems. New York, Harper Business, 297.

Moore, J.F. (1998). The Rise of a New Corporate Form. Washington Quarterly. 21(1), 167-181.

Muniz, Albert M., Jr. and Hope Jensen Schau (2005), ‘‘Religiosity in the Abandoned Apple Newton Brand Community,’’ *Journal of Consumer Research, 31* (March), 737-747.

Müller, R. M., & Thoring, K. (2012). Design thinking vs. lean startup: A comparison of two user-driven innovation strategies. *Leading Through Design*, *151*.

Möller, K., & Svahn, S. (2009). How to influence the birth of new business fields—Network perspective. *Industrial Marketing Management*, *38*(4), 450-458.

O'Connor, G. C., & Rice, M. P. (2013). New market creation for breakthrough innovations: Enabling and constraining mechanisms. *Journal of Product Innovation Management*, *30*(2), 209-227.

Ogawa, Susumu and Frank T. Piller (2006), ‘‘Reducing the Risks of New Product Development,’’ *Sloan Management Review, 47* (Winter), 65-72.

Owens, J. D. (2007). Why do some UK SMEs still find the implementation of a new product development process problematical? An exploratory investigation. *Management Decision*, *45*(2), 235-251.

Palmatier, R. W. and Evans, K. R. (2008), ‘‘Influence of Customer Participation On Creating And Sharing Of New Product Value,’’ *Journal of the Academy of Marketing Science, 36* (3), 322-336.

Peltoniemi, M., & Vuori, E. (2004, February). Business ecosystem as the new approach to complex adaptive business environments. In *Proceedings of eBusiness research forum* (pp. 267-281).

Piller, F. T., Ihl, C., & Vossen, A. (2010). A typology of customer co-creation in the innovation process. *Available at SSRN 1732127*.

Piller, F. T., & Walcher, D. (2006). Toolkits for idea competitions: a novel method to integrate users in new product development. *R&D Management*, *36*(3), 307-318.

Pitt, Leyland F., Richard T. Watson, Pierre Berthon, Donald Wynn, and George Zinkhan (2006), ‘‘The Penguin’s Window: Corporate Brands from an Open Source Perspective,’’ Journal of the Acad- emy of Marketing Science, 34 (Spring), 115-127.

Porter, M. E., & Millar, V. E. (1985). How information gives you competitive advantage.

Ries, E. (2011). The Lean Startup: How Today's Entrepreneurs Use Continuous Innovation to Create Radically Successful Businesses. *Crown Business, NY, USA*.

Sawhney, Mohanbir, Gianmario Verona, and Emanuela Prandelli (2005), ‘‘Collaborating to Compete: The Internet as a Platform for Customer Engagement in Product Innovation,’’ *Journal of Interactive Marketing, 19* (Autumn), 4-17.

Simons, R. (2010). Stress-test your strategy: The 7 questions to ask. *Harvard Business Review*, *88*(11), 93-100.

Slush. (2015). *Slush 2016*. Retrieved 13 April, 2016, from http://www.slush.org/.

Ulaga, W., & Chacour, S. (2001). Measuring customer-perceived value in business markets: a prerequisite for marketing strategy development and implementation. *Industrial marketing management*, *30*(6), 525-540.

Witell, L., Kristensson, P., Gustafsson, A., & Löfgren, M. (2011). Idea generation: customer co-creation versus traditional market research techniques. *Journal of Service Management*, *22*(2), 140-159.

WTO. (2016). *WTO*. Retrieved 28 April, 2016, from https://www.wto.org/english/tratop_e/region_e/region_e.htm.

Xie, Chunyan, Richard P. Bagozzi, and Sigurd V. Troye (2008), ‘‘Trying to Prosume: Toward a Theory of Consumers as Co-creators of Value,’’ *Journal of the Academy of Marketing Science, 36* (1), 109-122.

Yin, R. K. (2009). Case study research: Design and methods (4th Ed.). Thousand Oaks, CA: Sage.

York, J. G., & Lenox, M. J. (2014). Exploring the sociocultural determinants of de novo versus de alio entry in emerging industries. *Strategic Management Journal*, *35*(13), 1930-1951.

Zahra, S. A., & Nambisan, S. (2012). Entrepreneurship and strategic thinking in business ecosystems. *Business Horizons*, *55*(3), 219-229.

Appendices

Appendix A

New business development at the [case organization]

- In what ways does the [case organization] scan for new business opportunities? How are these new businesses developed?
- What is the style and character of product development? Alone, or together with universities for example? Big investments? In which fields? How are these fields chosen?
- How does the [case organization] support the commercialization and the business development?
- How does the [case organization's] prior commercialization knowledge appear in these new areas? Which areas are lacking support or knowledge?
- How does the [case organization] react to completely new markets? What about the life science industry?
- How does the [case organization] handle public relations regarding their new business developments?

Specific new business development

- How is the [case product] or another product chosen as one to move forward with?
- When and how is a team or organization built around a product?
- How does the business shape around a product? How are these opportunities scanned and identified?
- How is success measured at [the case organization]?

[Specific technology] market

- Could you tell me about [the specific sector within the life science industry] as a market? How does it compare to others in, for example, biotechnology? Are there some distinguishing features?
- What is the life cycle stage of the market at the moment? For example, is it growing? What indicators are there?
- What are the key challenges and opportunities for companies operating in this field?

- How does process innovation take place in life sciences? How is process innovation within the [specific application] industry viewed?
- How are products and services legitimated within the [specific application] industry? What are the key factors?
- Being a recent entrant to the market, what have been some major challenges you have faced? How have you managed these?

[Specific technology] within the life science industry

- What are the most popular applications of [specific] technology? Where could it be used more?
- What drives the adoption of [specific technology] methods? What hinders it?
- How much is [specific technology] in, for example, the pharmaceutical industry used?

Customers

- Who are currently the key customers of the [specific sector]? Why? Who will they be in the future?
- What do they look for in the products in the [specific sector] of the life science industry?
- How would you describe the process where they use the product in?

[Case product]

- How does the [case product] sit in within the [specific technology] market?
- What kind of a product is the [case product]? How incremental vs. radical?
- What are the special features of the [case product]? What about the handicaps or bottlenecks against success?
- What are the production costs? Is it possible to gain a good margin on the product? Are there special needs or problems involved in the production process? How scalable is the production?
- Is it possible to customize the product according to customer needs?

The lean start-up approach and co-development with customers

- Describe the collaboration that the [case organization] does with customers? How has this worked out?

- How have customers improved your business? Or have they?
- Is there co-operation with customers, for example, in product development? How would you describe this co-operation?
- What is important when developing products in co-operation with others? What should be accounted for?
- How well do the customers know what they want? Are there any hidden needs that arise when developing products together with the customers?

Competition

- Could you tell me about the competitive set-up between the companies involved in [the market]? What is typical of competition?
- How do the competitors differentiate themselves from each other?
- What is competitive advantage typically based on?

Business models

- What types of business models seem to work within the market? Why?
- What types of business models have you considered? Material supplier vs. solution provider?
- Is there some kind of knowhow that the [case organization] could purchase to develop the business model?

Others

- Is there anything I have not asked about that would be important to understand?